

CHECKING
FUEL-INJECTION PUMPS

Workshop: EP
08.1997
ST 0568 De

Test specifications
referenced to date of issue

Test specifications referenced to date of issue are being introduced to improve the testing and adjustment accuracy of in-line and distributor-type pumps in future.

As of 14.7.1997, these test specification sheets can be called up by fax from KH/VSK in Wernau (Bosch Service Stations in Germany via Btx, subsidiaries and agents abroad online).

What is the method of determining
* test specifications referenced
to date of issue?

1. Read off and decode date of manufacture on pump rating plate (refer to Service Information: Date of manufacture for Bosch products as at 01.1990).
Note: 3-position date of manufacture is referenced to month, 5-position date to day.
2. Enter the assembly number in the usual way on the input mask for fax call-up.

3. Proceed as follows if several assemblies are displayed under one assembly number:
Consecutively compare:
* Customer ident no.
* Pump designation
* Governor designation
to data on pump rating plate.
If this comparison reveals several identical assemblies, compare date of issue of each test specification sheet to decoded date of manufacture of fuel-injection pump.

Example:

Date of manufacture: FD 76721
(767 = Month code
21 = Calendar day)

Decoded: 21.07.97

Issue date 1st test spec. sht.:20.05.97

Issue date 2nd test spec. sht.:25.07.97

Case 1:

To check fuel-injection pump/governor assembly, use

* Test specification sheet
issued on 20.05.97.

Case 2:

If the date of manufacture was earlier than 20.05.97 and there is no older test specification sheet available, use the test specifications in the 20.05.97 issue.

Case 3:

If the date of manufacture is later than 20.05.97, use the test specifications in the 25.07.97 issue.

The following always applies:
Use the test specification sheet with
* issue date prior to or same as
date of manufacture of fuel-
injection pump.

Published by:

Robert Bosch GmbH
Division KH
After-Sales-Service Department for
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country.

DPICO
INJECTION PUMPS

Workshop: EP
10.1997
SI 0567 En

Diesel Service

For some time now Korean vehicles with DPICO - diesel injection pumps have been being sold in Europe.

The Korean company DPICO (Doowon Precision Industry Co.) manufacture pumps, nozzles and nozzle-holder assemblies.

Pumps are also being delivered which are similar in their construction to those made by Zexel, which however come from DPICO.

The customers of the first equipment by DPICO are the companies KIA, Asia, Daewoo, Ssangyong and Hyundai.

An after-sales service agreement between DPICO and Bosch does not exist. For this reason Bosch can not make spare parts lists, spare parts, test specifications, tools or any other service documentation available or procure them.

Should a vehicle with a DPICO pump be in your workshop awaiting a diesel repair, please refer the customer to the trade-mark workshop with the explanation that a service agreement between DPICO and Bosch does not exist.

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(KH/VKD 2)

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PES 4 M ..RS 185
G 400 074 883

Workshop: EP
10.1997
ST 0578 En

Modification of idle leaf spring

To improve load take-up (engine cuts out with AC switched on), the above-mentioned assembly has been fitted as of FD 76127 with a modified idle leaf spring 1 421 215 017 in place of the installed leaf spring 1 421 215 015.

Contrary to the test specification sheet on the microcard, the following check values apply to incoming measurements on pumps prior to FD 67107:

Prior to FD 67107 0 400 074 883 F1:

- * Idle stage 5.0 mm
- * Idle setting
n = 375 l/min: 5.9...6.1 mm CRT
- * Load take-up
n = 250 l/min: min. 9.0 mm CRT
- * Pneumatic idle increase
n = 425 l/min: 7.6...9.2 mm CRT
n = 425 l/min:
17.0...26.0 cm³/1000 strokes
Vacuum -400 mbar

Prior to FD 76127 0 400 074 883 F2:

- * Idle stage 6.0 mm
- * Idle setting
n = 375 1/min: 5.9...6.1 mm CRT
- * Load take-up
n = 250 1/min: min. 9.0 mm CRT
- * Pneumatic idle increase
n = 425 1/min: 7.6...9.2 mm CRT
n = 425 1/min:
17.0...26.0 cm³/1000 strokes
Vacuum -450 mbar

The WP microcard test specifications apply following conversion (installation of modified leaf spring 1 421 215 017).

Bosch and Daimler-Benz have agreed upon the following cost-handling procedure:

- * Check IP assembly about which complaint has been received with regard to injected-quantity profile and CRT in line with date of manufacture.
- * If measured values are not within checking tolerances of corresponding test specification, incoming measurement costs will be borne by Bosch. Warranty/goodwill claim with measurement record to be sent to K5/QSG1. Service stations outside Germany should consult their local representative.
The number of this service telegram (ST 0578) must be entered in the plain language field "C".

* If the values are within the tolerance, the costs of incoming and outgoing measurement will be assumed by Daimler-Benz.

* The costs of converting older IP assemblies to idle leaf spring 1 421 215 017 will be borne by the branch office issuing the order.

The costs of conversion will be billed in the event of AC retrofitting.

* Following conversion, the letter "Y" is to be marked on the rating plate of the fuel-injection pump after the assembly part number.

List (allocation) of new IP assy.

FD 46501 - FD 67107					
01.05.94 - 07.11.96	0	400	074	883	F1
FD 67108 - FD 76126					
08.11.96 - 26.01.97	0	400	074	883	F2
FD 76127 -->					
27.01.97 -->	0	400	074	883	F3

The system used for the FD code is as follows:

e.g. 671 = Month code
29 = Calendar day

The FD-specific test specification sheets can be obtained by fax from KH/VSK1 in Wernau (Bosch service stations in Germany via BTX, subsidiaries and agencies abroad online).

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ALTERATION TO
BOSCH PART NUMBERS

Workshop:
EP,EL,SV
10.1997
ST 0580 En

For the past 30 years or so, all Bosch parts and products have been given a ten-position number (type number).

As free numbers are no longer available, it is often not possible to newly assign parts and products in the old number system. A new number system is therefore to be introduced.

Structure of item number (previously part number)

The item number is a ten-position alphanumerical number. For reasons of legibility, it is however no longer possible to have more than two consecutive alpha characters.

Use can be made of all letters with the exception of I, O and Q, as these can easily be misread.

Notation

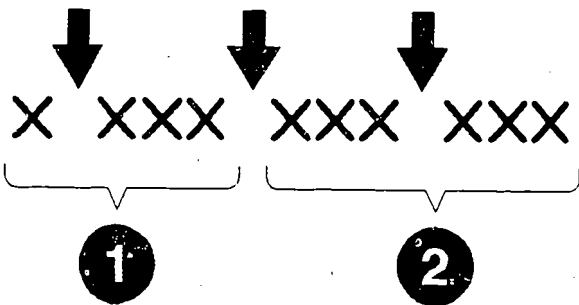
As in the past, the item number is split up by significant spaces after the first, fourth and seventh positions.

Example: F 002 A0Z 200

All products and parts will continue to receive an item number which is not to be altered. The most significant new feature is that it is only possible to determine where the number was allocated, but not the type of part or product involved.

Arrows = Mandatory space
1 = Where allocated
2 = Reference number

KMK09587



Usage example:

F 002 A0Z 200

F 002 = Where allocated
 (e.g. F 002 = MICO India)

A0Z 200 = Reference number

In areas where part numbers are still available in the old system, these may be allocated for a transitional period.

As regards materials, the existing rules laid down in the respective Bosch Standards will continue to apply for the time being.

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0 400 866 219
FOR CUMMINS-ENGINES
Samsung Excavator Model
MX222 / SE210LC-2 and MX8W

Workshop: EP
02.1998
SI 0581 En

Cummins Engine Co. has issued Temporary Repair Practice / Field Campaign to correct loosened bearing end plate bolts on the subject Fuel Injection Pump installed in Samsung excavator.

Affected Engine Serial Numbers are:
for the TPR 21155012 to 21249143 and
for the FC 21168445 to 21240594.
Both the TPR and the FC require
modifications to vehicle and engine.
Without these modifications the repair
you perform may be ineffective and the
bearing end plate may loosen again.

FTP with Manufacturing Date Code 669 (September 1996) have already been modified and are not affected by this Service Letter.

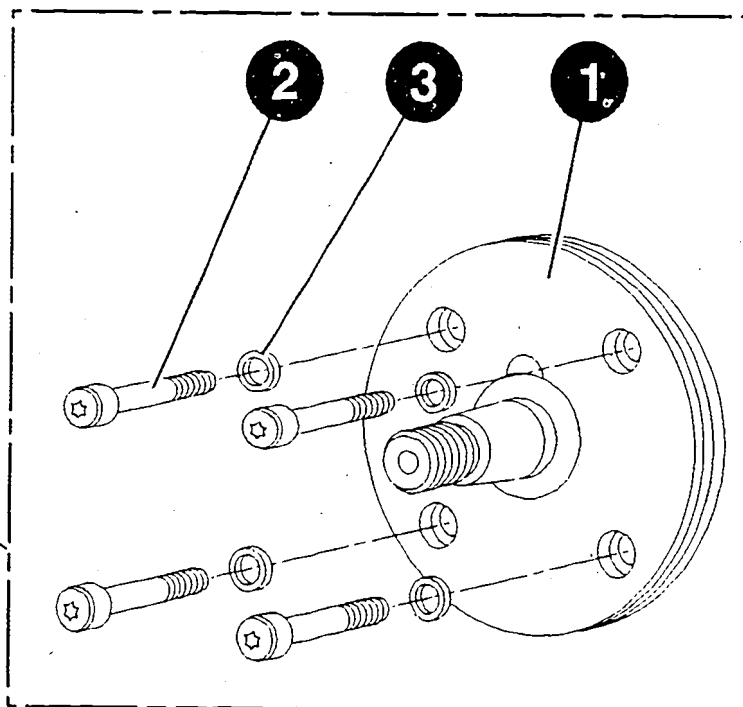
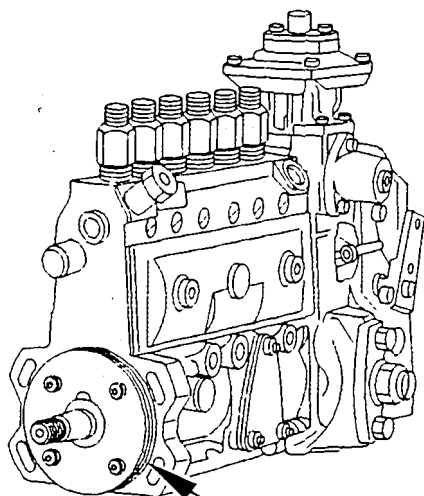
Your customer should have a complaint of "oil leaking around FIP mounting flange" or "broken camshaft" or "erratic ERPM".

Proceed with the repair as follows:

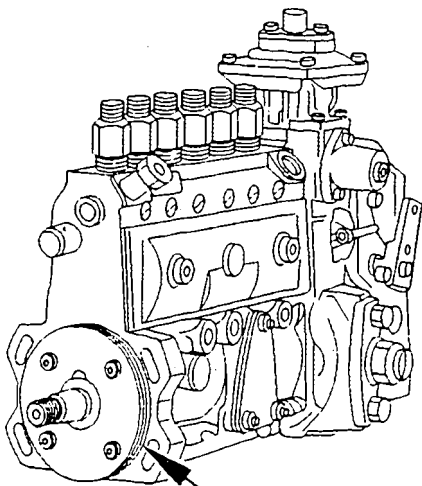
1. On FIP without any damage, using standard Bosch repair procedures, replace the current bearing end plate with the new version PN F 002 A11 208 (Pos. 1).

Discard the old screws and replace with new low head Torx screws M6 x 18 mm grade 10.9, PN 2 912 742 199 (Pos. 2).

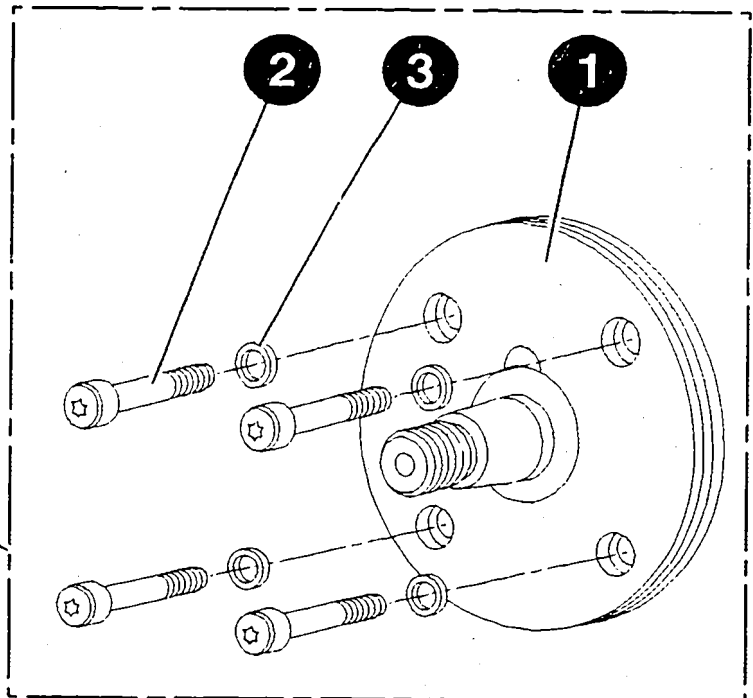
KMK09525



Clean the screw bores in the FIP housing, install the screws and steel spacers PN 1 410 100 037 (Pos. 3) with Loctite 270 following manufacturers recommendations and torque to 10 +1 Nm, loosen and retorque again to 10 +1 Nm. Refer to the parts list for all other parts and gaskets necessary.



KMK09525



2. On FIP with damage, inspect all relevant parts, camshaft, roller tappets, flyweights, housing, etc., for damage. Assess damage and compare cost to that of a new or reconditioned FIP, taking into consideration customers urgency for the vehicle, before proceeding with the repair as described in Point 1.

3. Cummins also requested that the current shut-off lever be upgraded from 1 421 910 154 to 1 421 910 160. This new lever allows for more FIP to engine clearance. Please make sure that the shut-off lever return spring has been removed since it will interfere with the shut-off solenoid function.

4. Identify the repair by stamping the letter "B" on the nameplate in front of the 10-digit part number.

Bearing end plate repair/upgrade, as well as shut-off lever upgrade, are not warrantable repairs and are to be charged to the customer/OEM dealer.

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RADIAL-PISTON DIST.-
TYPE FUEL-INJECTION
PUMPS VR..M.. (VP44)
WITH SOLENOID VALVE CONTROL

Workshop: EP
02.1998
ST 0596 En

Service concept

1. SYSTEM DESCRIPTION AND GENERAL INFORMATION

BOSCH developed the radial-piston distributor-type fuel-injection pump with solenoid-valve control (VP44) to lower the fuel consumption and improve the emission levels of high-speed, heavy-duty diesel engines.

The pump is characterized by more dynamic injected-quantity and start-of-injection control, as well as by pressures of up to 1600 bar at the injection nozzle. On future fuel-injection pumps, fuel metering will be assumed by a high-pressure solenoid valve, which directly seals off the plunger-and-barrel assembly chamber. Externally, these pumps can be recognized by the solenoid valve at the distributor head and a control unit attached to the top of the pump.

Further details can be found in the Technical Information (1 987 722 053).

2. CUSTOMERS, VEHICLE MODELS, LAUNCH DATES, MARKETS

The following vehicle/engine manufacturers have so far equipped their vehicles with the VP44:

- AUDI A6 2.5 TDI
standard in Europe since 07.97
- OPEL Vectra B, 2.0 DTL, DTH
standard in Europe since 09.96
- OPEL Astra-F, 2.0 DTL
standard in Europe since 09.97
- CUMMINS (engine 6BTAA 5.9 l)
standard in USA since 01.97

Other vehicle manufacturers will be incorporating the pump as standard in 1998:

- BMW 3 Series, 2.0 l (E46)
scheduled for Europe as of 09.98
- FORD Mondeo, Transit
scheduled for Europe as of 09.98

3. SERVICE INFORMATION

3.1 Equipment data

All BOSCH Diesel Service Stations will be informed with ESI and CD-A about the system components.

3.2 "New product"
Technical Bulletin

No "New product" Technical Bulletin has been compiled. The Technical Information (1 987 722 053) was published instead.

3.3 Trouble-shooting instructions
(vehicle)

All BOSCH Diesel Service Stations will be receiving detailed instructions describing vehicle trouble-shooting procedures.

Intended publications:

OPEL Vectra B 2.0 DTL	CD-S 98/5 planned
AUDI A6 2.5 TDI	CD-S 99/2 planned
OPEL Astra-F 2.0 DTL	CD-S 99/3 planned
OPEL Vectra B 2.0 DTH	CD-S 99/4 planned
BMW 3 Series, 2.0l	CD-S 99/4 planned
FORD Mondeo, Transit	CD-S 99/6 planned
CUMMINS (engine 6BTAA 5.9l)	Not planned at present; to be compiled in USA by vehicle manufacturer.

3.4 Testing and repair instructions for VP44

Bosch Diesel Service Stations will be receiving detailed instructions describing the testing and repair procedures for the VP44.

Planned publication:

CD-W 99/1

4. REPLACEMENT PARTS

4.1 Europe

All system components intended as replacement parts will be available from the BOSCH Distribution Center in Karlsruhe (VZK).

Exception: The control units programmed at the end of the line cannot be supplied ready for installation at present by KH. The control units will be marked accordingly in our equipment documentation (CD-A).

BOSCH subsidiaries/agents abroad are to draw up their replacement-part schedules on the basis of the existing market situation/number of items on call.

4.2 USA and Canada

The replacement-parts supply concept for North America is to be drawn up in conjunction with BOSCH USA.

Stocks will be based on the corresponding vehicle sales figures.

5. EXCHANGE SYSTEM

System components suitable for exchange within a conventional exchange system will be offered at special prices as new items in the launch phase.

It will only be possible to set up an exchange line for the fuel-injection pump, control units and dual-spring nozzle-holder assemblies once a sufficiently large return volume is available.

The exchange products currently available are indicated in our equipment documentation (CD-A).

6. TROUBLE-SHOOTING, TESTING AND REPAIR

6.1 Vehicle trouble-shooting

With trouble-shooting instructions: BOSCH Diesel Service Stations will be receiving vehicle-specific trouble-shooting instructions describing the vehicle trouble-shooting procedures (see 3.3).

With KTS 300 test software:

OPEL Vectra B 2.0 DTL
already available as of CD-S 97/4

Intended KTS 300 test software publications:

AUDI A6 2.5 TDI

planned for CD-S 98/4

OPEL Astra-F 2.0 DTL

planned for CD-S 99/3

OPEL Vectra B 2.0 DTH

planned for CD-S 99/4

BMW 3 Series, 2.0l

planned for CD-S 99/4

FORD Mondeo, Transit

planned for CD-S 99/6

CUMMINS (engine 6BTAA 5.9l)

Not planned at present; to be compiled in USA by vehicle manufacturer.

6.2 Testing and repair concept

6.2.1 VP44

Testing on pump test bench and pump repairs are envisaged as of the start of 1999. Appropriate information will be published in due course.

In the interim period, a defective VP44 can be replaced in a warranty situation by BOSCH Service Stations with an exchange pump (new item). The defective VP44 is to be sent for examination to Bosch Quality Assurance (K5/QSG) which will be keeping fault statistics on this system.

Any necessary improvements can thus be implemented without delay.

6.2.2 2-F-DHK (dual-spring nozzle-holder assembly)

Testing and repair are currently still being checked. Appropriate information will be published in due course.

In the interim period, a defective 2-F-DHK can be replaced in a warranty situation by BOSCH Service Stations with an exchange DHK (new item). The defective DHK is to be sent for examination to Bosch Quality Assurance which will be keeping fault statistics on this system.

It will thus be possible to gather information centrally on all faults and complaints encountered in the field and analyse system reliability.

6.2.3 Other components (e.g. temperature sensor, speed sensor)

These components can be replaced as complete units (not repaired).

7. TEST SPECIFICATIONS

Test specifications (set values) for the electronics are contained in the KTS 300 test software and in the vehicle-specific trouble-shooting instructions.

EP test specifications will be available on CD-W as of the start of 1999.

8. SERVICE TOOLS

8.1 Vehicle trouble-shooting

Tools for removing and installing the VP44 (Opel) are being prepared. Corresponding information can be found in the trouble-shooting instructions (Opel Vectra B) CD-S 98/5.

Further vehicle-specific removal and installation tools are at the preparation stage.

8.2 Testing and repair of VP44

Tools are currently being developed. Notice will be given of availability as of the start of 1999.

9. STAFF TRAINING

The BOSCH Technical Training Center in Wernau (Germany) is already providing the appropriate EDC courses for the VP44 system.

The content of these training courses will be supplemented accordingly as soon as the VP44 can be tested and repaired.

10. WARRANTY PROCEDURE

Warranty assessments of defective VP44 system components are to be performed on the spot by way of vehicle fault diagnosis.

As long as the VP44 can only be replaced in the field, Division K5 will be responsible for warranty assessment.

Components about which complaints are received are to be submitted during the warranty period together with warranty/goodwill claim and delivery note KH/VKD3-15333 for warranty assessment.

Corresponding warranty information is to be published for Bosch Service Stations.

BOSCH Service Stations in Germany can find the delivery address in the warranty handbook.

In other countries, components about which complaints have been received are to be sent to the local Bosch representative together with warranty and goodwill claim.

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Division KH
Technical After-Sales Service
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FUEL-INJECTION PUMP
ASSEMBLIES

Workshop: EP
02.1998
ST 0594 En

0 400 195 ...
0 400 196 ...

(M-PUMP WITH EDC
ADJUSTER RE 22 FOR
MERCEDES BENZ
PASSENGER VEHICLES)

The above fuel-injection pump versions
are installed in Mercedes-Benz vehicles
of the model series 202..., 210...,
140... and 463....

Engines: OM 605.91/.96
OM 606.91/.96

COMPLAINT:

The complaint "Engine cuts out from
time to time" may be received regarding
these vehicles. According to the
Mercedes-Benz diagnosis tester, the
self-diagnosis of the EDC system
signals the fault code 1220 (rack
travel sensor) and/or 1223 (injected-
quantity adjuster).

CAUSE OF TROUBLE:

Fault analysis is still in progress.
Tests to date have however shown the
problem to be in the area of the
electrical adjuster connection.

REMEDY/FAULT RECTIFICATION:

Following agreement with Bosch, Mercedes-Benz have issued their Service Organisation with service information on the problem and the procedure to be employed.

Accordingly, checking should first involve examination of primary possible causes in line with trouble-shooting charts and checking of EDC control unit/RE adjuster connector contacts (corrosion, pins bent apart). The entire wiring harness is to be checked for loose contacts around the connectors with the engine running.

REMEDY/FAULT RECTIFICATION (continued):

The fuel-injection pump is only to be removed and taken for servicing to a Bosch Service Station (offering EDC service) if the preceding checks do not reveal any faults and no other fault codes have been stored.

Scope of work to be performed at Bosch Service Station:

- Disassembly of adjuster (cover)
- Replacement of lead complete with plug and contact plate
- Adjuster assembly
- Checking and adjustment of pump assembly on pump test bench.

ADJUSTER REPAIR:

Please refer to the Repair and Test Instructions for M/RE 22 adjusters as regards the performance of repair work.

Particular attention is to be paid to the detailed soldering specifications. A concluding inspection is always to be made with a magnifying glass to make sure the soldering connections are OK.

Final checking and possible adjustment of the assembly on a pump test bench are essential.

PARTS REQUIRED:

- Wiring harness complete with plug:

For fuel-injection pump assemblies

0 400 195 001, ..002,

0 400 196 002, ..003

(round black plug): 1 424 479 002

For fuel-injection pump assembly

0 400 195 004

(square white plug): 1 424 479 003

- Contact plate for all versions:

1 421 099 004

WARRANTY:

The Bosch Service Station repair work described is subject to the standard warranty conditions, observing the following:

- Warranty claim G20/G21
- Section C
- Fault description A 13

Enter left-justified with no gaps.

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RQV..P..K

Workshop: EP

03.1998

Link fork sticking

ST 0597 En

The following complaint may be received about engines manufactured by RVI:

Delayed load take-up by engine when driving after releasing engine brake. It may not be possible to restart the engine without pressing the accelerator pedal slightly at the same time.

This is due to a sticking lock washer in the link fork of the governor (Fig., arrow).

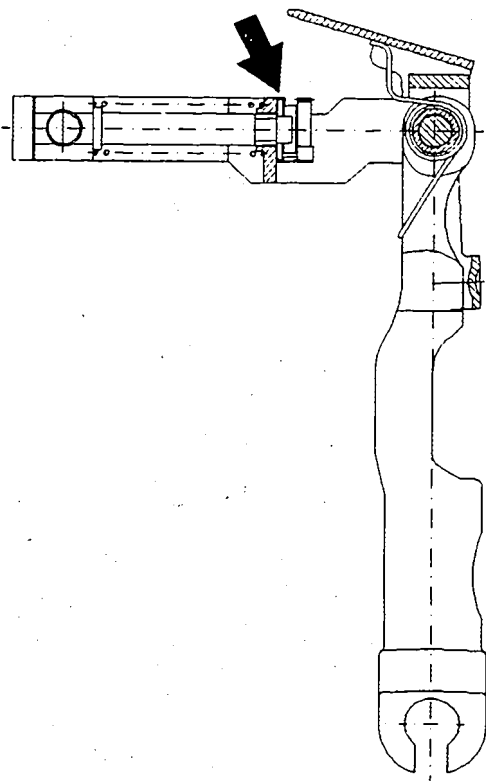
This may affect governors of the following pump assemblies manufactured between

770 16 and 771 12:

0 402 046 836, 0 402 046 862,
0 402 046 864, 0 402 046 870,
0 402 046 877, 0 402 746 883,
0 402 746 894, 0 402 746 928,
0 402 946 010, 0 402 946 011,
0 402 946 013, 0 402 946 027,
0 402 946 028,

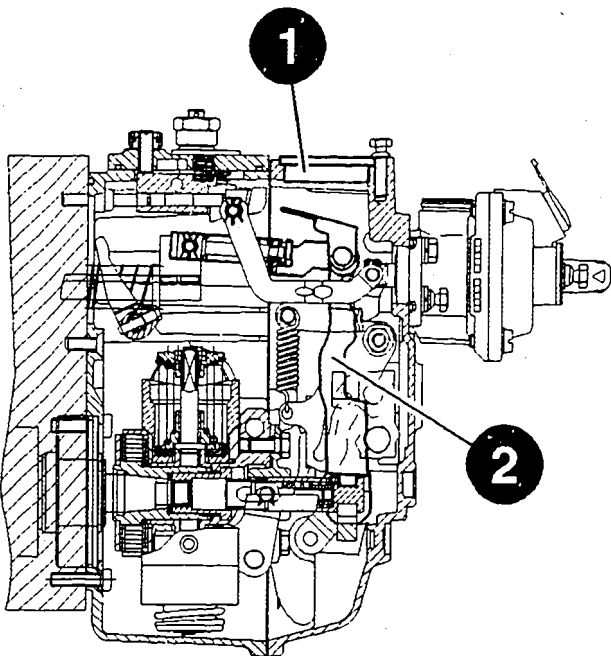
Trouble-shooting can be performed as follows with good accessibility with the assembly in position on the engine:

KMK09771



Disengage accelerator and shutoff linkage or Bowden cable. Screw out large screw plug in governor cover (item 1). Fully deflect control lever and actuate shutoff lever at the same time. A visual inspection through the open hole in the governor cover makes it possible to determine whether or not the lock washer in the link fork of the governor is sticking. If it is, detach entire pump assembly from engine and, following removal, replace fulcrum-lever unit (item 2) with a new one.

KMK09772



Check freedom of movement of lock washer before installing new fulcrum-lever unit.

When this work has been performed, the pump assembly must be set on a pump test bench.

If governor is not readily accessible on engine, detach entire pump assembly from engine and perform the test described after removal.

The following work units will be remunerated during the warranty period:

* Removal and installation of pump assembly on engine: 85 WU

* Replacement of fulcrum-lever unit and subsequent re-adjustment of pump assembly: 30 WU

Fault no. 40 is to be entered in the warranty report. The plain language description should be: "Link fork sticking" with reference to this Service Telegram.

Attention: The warranty period agreed with RVI is 2 years or 320 000 km!

The costs of repair work are to be billed to customers after the end of the warranty period.

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ELECTRONICALLY
CONTROLLED FUEL-
INJECTION SYSTEM WITH
PUMP-NOZZLE UNIT (PDE)
FOR COMMERCIAL VEHICLES

Workshop: EP
03.1998
ST 0602 En

Service concept

1. SYSTEM DESCRIPTION AND GENERAL
INFORMATION

Modern commercial-vehicle engines which have to satisfy ever more stringent requirements in terms of pollutant emissions, fuel consumption and power output, require highly efficient fuel-injection systems characterized by a high injection-pressure level and both flexible and precise control. Such injection systems help to make today's DI commercial-vehicle diesel engines both thrifty and environmentally sound.

The electronically controlled fuel-injection system with PDE is of modular design.

The PDE is a single-cylinder fuel-injection pump with integrated solenoid valve and attached injection nozzle installed directly in the cylinder head of the diesel engine.

The PDE is driven by way of the engine camshaft with a rocker arm. Injection is effected by means of switching of the integrated solenoid valve, with the point at which the valve closes determining the start of injection and the length of closure the amount of fuel injected.

The solenoid valve is actuated by the electronic control unit attached to the engine.

The control unit evaluates all the relevant engine and environmental conditions recorded in the system and precisely defines the start of injection and the injected quantity required for environmentally compatible, low-consumption engine operation. In addition to these basic functions, there are a wide range of functions designed to ensure ride comfort.

To satisfy the demanding safety requirements, the system automatically compensates for and corrects any faults occurring in the system components and also permits exact injection-system and engine diagnosis if necessary.

Interlinkage with other electronic vehicle components is by way of the high-speed CAN data bus.

Detailed information will be provided in the vehicle-specific diagnosis instructions currently in preparation.

"PDE for commercial vehicles" will also be the subject of an article in the series "Bosch Technical Information", order no. 1 987 722 012 and ..038.

A further Technical Information publication on the PDE is being prepared.

2. CUSTOMERS, VEHICLE MODELS, LAUNCH DATES, MARKETS

The following commercial-vehicle manufacturers have so far equipped their vehicles with a PDE system:

- * VOLVO Truck Corporation (VTC),
vehicle FH12, engine D12,
standard in Europe since 12.94.
- * SCANIA, vehicle series 4 (124 e),
engine DC 1205, DC 1101, DC 1102,
standard in Europe since 09.97.
- * IVECO, vehicle "Eurotech",
engine F2B
standard in Europe since 10.97.

Special service procedures:

1. At the request of VTC Sweden, the PDE systems supplied by Bosch are to be serviced during the first four years after series launch exclusively by the Volvo Service Organisation.

On completion of this period, i.e. as of 12.1998, service work can also be carried out by the Bosch Service Organisation.

2. At their own request, Scania Sweden are reserving the right to handle service work within the Scania service network for the first three years after series launch.

This means that Scania vehicles equipped with PDE can also be serviced by the Bosch Service Organisation as of 09.2000.

3. SERVICE INFORMATION

3.1 Equipment data

All Bosch Diesel Service Stations will be informed with ESI and CD-A about the currently available system components.

3.2 "New product" Technical Bulletin

A "New product" Technical Bulletin is being replaced by the publication "Bosch Technical Information". A further issue relating to PDE is being prepared.

3.3 Vehicle-specific trouble-shooting instructions

The procedure for vehicle trouble-shooting will be described in detailed instructions.

The following publications are envisaged:

- * VTC vehicle FH12, engine D12:
CD-S planned for 10.1998, edition 98/5
- * SCANIA vehicle 124e,
engine DSC 1205-420
DSC 1101-340
DSC 1102-380:
CD-S planned for 08.2000, edition 00/4
- * IVECO vehicle Eurotech, engine F2B:
Date of CD-S not yet specified

3.4 Testing and repair instructions for PDE

Decentralized testing and repair of the PDE at Bosch or other Service Stations, is not envisaged at present for technical reasons. This also means that service replacement of the nozzle is not envisaged for the time being. PDE testing and reconditioning will be performed by Bosch at the factory concerned.

There is thus no need at present for the compilation of appropriate service documentation.

4. Replacement parts

4.1 Europe

All system components intended as replacement parts will be available from KH (BOSCH Distribution Center in Karlsruhe VZK).

Exception: The control units programmed at the end of the line (EoL) cannot be supplied ready for installation at present by KH. The control units will be marked accordingly in our equipment documentation (CD-A).

BOSCH subsidiaries/agents abroad are to draw up their replacement-part schedules on the basis of the existing market situation/number of items on call.

4.2 USA and Canada

The replacement-parts supply concept for North America is to be drawn up in conjunction with BOSCH USA. Stocks will be based on the corresponding vehicle sales figures. At present, there are no vehicles equipped with Bosch PDE on the North American market.

5. EXCHANGE SYSTEM

System components suitable for exchange within a conventional exchange system will be offered at special prices as new items in the launch phase. It will only be possible to set up an exchange line for the PDE and control units once a sufficiently large return volume is available. As soon as exchange products become available these will be incorporated into the equipment documentation (CD-A).

6. TROUBLE-SHOOTING, TESTING AND REPAIR

6.1 Vehicle trouble-shooting with trouble-shooting instructions and KTS 300/500 test software:

Bosch Service Stations will be receiving vehicle-specific trouble-shooting instructions describing the vehicle trouble-shooting procedure (see item 3.3).

6.2 Testing and repair concept

6.2.1 PDE

Testing on pump test bench and PDE repairs are not envisaged. Changes to this service concept will be published in due course.

In the interim period, a defective PDE can be replaced in a warranty situation by BOSCH Service Stations with an exchange PDE (new item in launch phase).

The defective PDE is to be sent for examination to Bosch Quality Assurance (K5/QSG) which will be keeping fault statistics on this system.

Experience gained relating to behavior in the field can thus be implemented without delay.

6.2.2 Electronic control unit

The control unit cannot be tested at Bosch Service Stations.

A defective control unit can be established in the course of system testing.

The control unit cannot be repaired in the field.

6.2.3 Other components (e.g. temperature sensor, speed sensor)

Components found to be defective in the course of system testing are to be replaced as complete units. Individual system component repairs are not economically viable.

7. TEST SPECIFICATIONS

Test specifications (set values) for the electronics are provided by the KTS 300/500 test software and the vehicle-specific trouble-shooting instructions.

8. SERVICE TOOLS

8.1 Vehicle trouble-shooting

Tools for removal and installation of the PDE and, where applicable, system components will be drawn up for each vehicle.

8.2 Testing and repair of PDE

No testing and repair of the PDE will take place outside the appropriate Bosch factory. The Bosch Service Organisation does not therefore require any specific tools as yet.

9. STAFF TRAINING

The course schedule at the Bosch Training Center in Wernau is being extended to include instruction on diagnosis procedures for PDE systems on commercial-vehicle Diesel engines. These courses will be available as of 01.1999.

The content of these training courses will be adapted accordingly as soon as any technical modifications are made to the service concept for PDE systems.

10. WARRANTY PROCEDURE

Warranty assessments for system components can be made by Bosch Service Stations on the basis of the diagnosis instructions. Individual component testing is not envisaged.

Remuneration for defective components including the PDE will take the usual form.

During the warranty period, components about which complaints are received are to be submitted for warranty assessment together with warranty/goodwill claim and delivery note KH/VKD3-15333.

- * Bosch Service Stations in Germany will find the delivery address in the warranty handbook.
- * In other countries, components about which complaints are received are to be sent together with warranty and goodwill claim to the local Bosch agent.

Special information on warranty procedures for PDE systems in commercial vehicles will be published in 12.1998.

Published by:

ROBERT BOSCH GMBH
Division KH
Technical After-Sales Service
(KH/VKD 2)

Please direct questions and comments concerning the contents to our authorized representative in your country

FUEL-INJECTION PUMP
ASSEMBLY

0 403 486 105

for Fendt tractor Favorit 822

Workshop: EP

03.1998

ST 0605 En

Leakage at control-lever mount of
governor cover.

This edition supersedes the Service
Telegram ST 0562 (05.1997)

More advanced version of MW fuel-
injection pump with heavy-duty
governor and new governor cover,
as well as a new reverse-transfer
lever.

Suggested governor conversion for
fuel-injection pump assemblies:

The fuel-injection pump assemblies
(EPK) listed below can be converted
on the basis of this recommended
procedure if complaints are received
about "External lubricating-oil
leakage".

The following may be affected:

EPK 0 403 486 105

Pump 0 413 406 225

(PES 6 MW 100/321 RS 1231

Governor 0 420 085 209

(RSV 300...1100 MW0A343-1)

On these pump assemblies, leakage may occur due to wear at the control-lever mount.

If such leakage proves to be the cause of damage, the governor is to be converted to the heavy-duty version (HD) by installing a different governor cover and a different flyweight assembly.

EPK	0 403 486 105
Pump	0 413 406 225
	(PES 6 MW 100/321 RS 1231)
Governor	0 420 085 209
	(RSV 300...1100 MW0A 343-1)
New governor cover:	1 425 628 671
New flyweight assembly:	1 428 194 025

Note:

The governor rating plate must be removed from the old governor cover and attached accordingly to the new one.

Governor components exchanged should be rendered unusable and scrapped by Bosch Service Stations.

Stipulation:

During the warranty period, cases of damage will be handled by way of normal warranty.

35 WU will be remunerated for conversion work (not including incoming inspection).

If leakage is found at the control-lever mount after the warranty period has expired, an extension of 3 years will be granted.

The number of hours of operation must then however not exceed 6000.

Damaged parts removed must be submitted to BOSCH, as otherwise costs cannot be reimbursed.

Replacement parts and conversion costs will be fully reimbursed. The costs of removing and installing the fuel-injection pump assembly are to be invoiced to the customer.

The following entries are to be made in the warranty/goodwill claim G20/G21:

Fault number : 40

Warranty type: 0(warranty)/7(goodwill)

C section : Job card number

Plain lang. : R0497-FENDT

Box 80 : "X"

Damaged parts are to be submitted together with warranty claim (G20/G21) and delivery slip KH/VKD 3 - 15333-2 to the following address:

Within Germany:

Robert Bosch GmbH

FEW/LOG 3 - Auspackraum

for forwarding to K5/QSG 1 - Hugo

Am Boschwerk

70469 Stuttgart

In all other countries:

Submit to local agent for forwarding
to K5/QSG 1 - Hugo

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Technical After-Sales Service
(KH/VKD 2)

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FUEL-INJECTION PUMP
ASSEMBLY

Workshop: EP
03.1998
ST 0606 En

0 403 486 106
for Fendt tractor Favorit 824

Leakage at control-lever mount of
governor cover.

This edition supersedes the Service
Telegram ST 0562 (05.1997)

More advanced version of MW fuel-
injection pump with heavy-duty
governor and new governor cover,
as well as a new reverse-transfer
lever.

EPK	0 403 486 106
Pump	0 413 406 226 (PES 6 MW 100/321RS 1232)
Governor	0 420 085 210 (RSV 300...1150 MW0A343-2)

The governor is to be converted to
the heavy-duty version (HD) by
installing a different governor cover
and a different flyweight assembly.

EPK 0 403 486 106
Pump 0 413 406 226
(PES 6 MW 100/321 RS 1232)
Governor 0 420 085 210
(RSV 300...1150 MW0A 343-2)
New governor cover: 1 425 628 672
New flyweight assembly: 1 428 194 025

Marking of converted pumps:

The area between pump flange and flange bushing (plunger and barrel) of cyl. 1 is to be marked "X".

Note:

The governor rating plate must be removed from the old governor cover and attached accordingly to the new one. Exchanged governor components are to be rendered unusable and scrapped by Bosch Service Stations.

Stipulation:

35 WU will be remunerated for conversion work (not including incoming inspection).

Conversion is to be confirmed on the Fendt sheet accompanying the fuel-injection pump (please fill in warranty claim number G20/G21).

Parts to be replaced and conversion costs will be fully remunerated. Removal and installation costs for the pump assembly are to be billed to the customer.

The following entries are to be made in the warranty/goodwill claim G20/G21:

Fault number : 40

Warranty type: 0(warranty)/7(goodwill)

C section : Job card number

Plain lang. : R0497-FENDT

Field 80 : "X"

Submit warranty claim (G20/G21) to the following address:

In Germany to:

Robert Bosch GmbH

K5/QSG 1 - Hugo

Am Boschwerk

70469 Stuttgart

In all other countries:

Submit to local agent for forwarding
to K5/QSG 1 - Hugo

Published by:

ROBERT BOSCH GMBH
Division KH
Technical After-Sales Service
(KH/VKD 2)

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NEW TIMING-DEVICE TRAVEL
MEASURING TOOL
1 688 130 227
FOR HEAVY-DUTY EDC
DIST.-TYPE FUEL-INJ. PUMPS

Workshop: EP
03.1998
ST 0608 En

Heavy-duty EDC distributor-type fuel-injection pumps (L2) have been fitted since January 1997.

CHARACTERISTIC FEATURES OF DISTRIBUTOR-TYPE PUMPS

IDI:

Designed for up to 450 bar plunger and barrel assembly pressure

DI:

Designed for up to 600 bar plunger and barrel assembly pressure

HDI-L0: e.g. VE..R595

Designed for up to 700 bar plunger and barrel assembly pressure

Features: Carbon-coated bearing pin

HDI-L1: e.g. VE..R638/R642

Designed for up to 800 bar plunger and barrel assembly pressure

Features: As L0; additionally with coated thrust washer

CHARACTERISTIC FEATURES OF DISTRIBUTOR-
TYPE PUMPS

HDI-L2: e.g. VE..R712

Designed for up to 950 bar plunger and
barrel assembly pressure

Features: As L1;

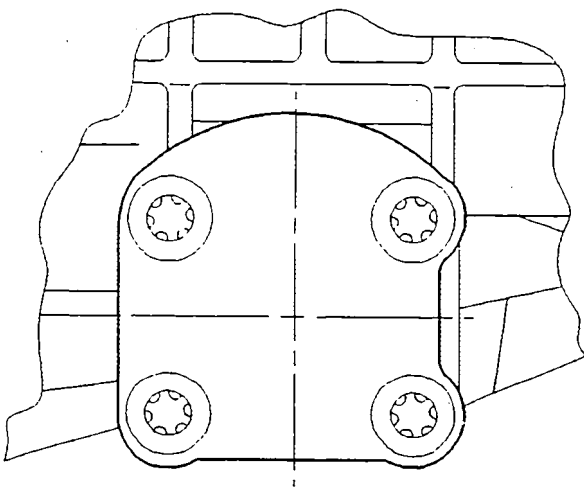
DM05 nitrided yoke

HDI = High-pressure DI

CHARACTERISTIC FEATURES OF HEAVY-DUTY (L2) VE PUMP

- 4-hole mount for timing-device cover with sealing plate (Fig.) (does not apply to VE..F for Ford)
- Central screw plug with modified sealing surface

KMK09166



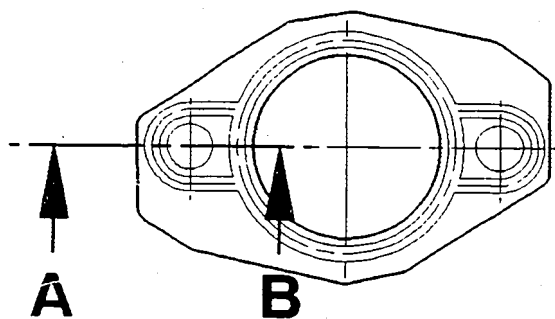
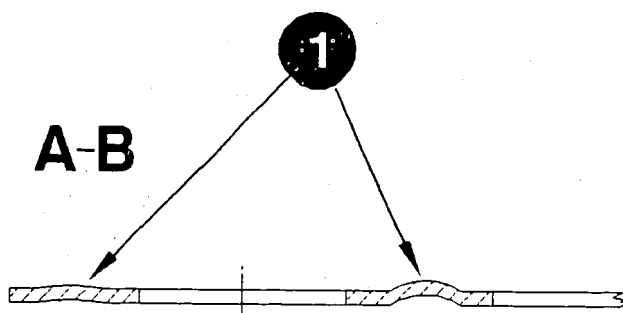
CHARACTERISTIC FEATURES OF HEAVY-DUTY (L2) VE PUMP

Pay attention to installation position
when fitting timing-device sealing
plates.

Curved sealing surface must face
inwards (timing-device hole).

1 = Curved sealing surface

KMK09167

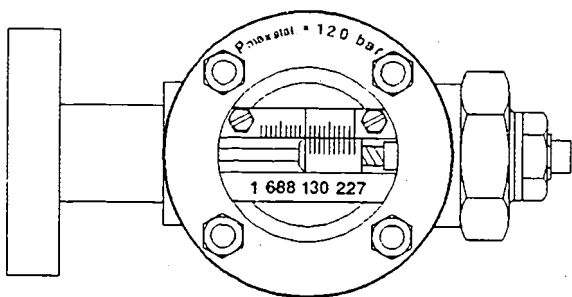


NEW TIMING-DEVICE TRAVEL MEASURING TOOL

FOR SAFETY REASONS (DESTRUCTION OF VIEWING PORT), PREVIOUS MEASURING TOOL (1 688 130 139) IS NOT TO BE USED FOR TESTING L2 VE PUMPS.

FOR CHECKING HEAVY-DUTY VE PUMPS (L2), EXCLUSIVE USE IS TO BE MADE OF THE NEW TIMING-DEVICE TRAVEL MEASURING TOOL, PART NO. 1 688 130 227.

KMK09801



LIST OF PUMPS

The following VE..E pumps are affected:

0 460 414 990	VE	R712	VW
0 460 414 889	VE	R712-1	VW
0 460 404 973	VE	L720	Rover
0 460 404 999	VE	L718	VM
0 460 426 999	VE	L719	VM

SAFETY MEASURES

- Only operate pump with anti-rotation element in clamping bracket.
- Pump, nozzle-holder assembly and fuel-injection tubing become hot (danger of burns).
- Wear appropriate ear protection on account of pump noise.
- Switch on extractor due to gassing and evaporation of calibration oil.

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TEST EQUIPMENT FOR EDC
IN-LINE PUMPS

Workshop: EP
03.1998
ST 0611 En

UNIVERSAL TEST LEAD 0 986 610 102
(KDEP-P 400/2)

This test lead is the universal connecting lead between EDC tester (25-pin plug) and system adapter lead to RE positioner (8-pin round plug).

The procedure described in the following relates only to the version with the former designation KDEP-P 400/2.

COMPLAINT:

Observations made in the field give grounds for assuming that certain leads were supplied with the wrong cable material in the period up to the end of 1993.

It is unfortunately no longer possible to establish the number of incorrect deliveries made.

The problem relates to the three-pin connecting lead between the 25-pin tester plug and the 8-pin round plug, i.e. the lead for evaluating the rack travel sensor signal.

FAULT DESCRIPTION:

The lead (Radox 155) prescribed in the drawing for the rack travel sensor evaluation circuit is a special design with precisely defined ratings. The three individual cores are arranged in a special sheath with precisely stipulated intermediate spacing and no twisting. This version is a prerequisite for compliance with the tight adjustment tolerances for RE positioners. As has now become apparent, the use of a simple rubber lead can result in impermissible deviations in actual voltages and thus possibly in incorrect settings.

ACTION:

Please check that your test lead(s) is/are correct (leads with former designation KDEP-P 400/2). Features:

- * This affects the three-core connecting lead between 25-pin plug and 8-pin round plug.
- * The correct lead is of an anthracite color (almost black) and has a far firmer sheath than the other rubber leads. It is marked "Huber und Suhner Switzerland Radox 155" in yellow.
- * Leads found to be incorrect so far have been pale grey like the three-core lead for measuring actual voltage.

ACTION (continued):

If leads are found to be definitely incorrect, please order new ones immediately and make exclusive use of these.

- * Bosch Service Stations in Germany should return faulty leads to the following address:

Robert Bosch GmbH
KH/LAV-Auspackraum
zur Weiterleitung an KH/QSG
Auf der Breit 4
76227 Karlsruhe

Following receipt and checking, your account will be credited accordingly for the test leads.

- * Bosch Service Stations outside Germany should send faulty leads to their local Bosch representative for forwarding to:

Robert Bosch GmbH
KH/LAV-Auspackraum
zur Weiterleitung an KH/QSG
Auf der Breit 4
76227 Karlsruhe
Germany

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DIESEL STORAGE-TYPE
INJECTION SYSTEM
COMMON RAIL (CR)

Workshop: EP
04.1998
ST 0613 En

Service concept

System description and general
information

Powerful modern high-speed diesel engines for passenger vehicles, which have to cope with increasingly stringent regulations in terms of pollutant emissions, fuel consumption and performance, require efficient injection systems characterized by a high injection pressure level and control action which is both flexible and precise. Such injection systems help to make today's DI passenger-car diesel engines thrifty and environmentally sound.

Common-rail systems make use of a high-pressure pump to store fuel at high pressure in the common rail. The fuel-pressure level is set by a control loop made up of pressure sensor, control unit and pressure regulator.

Flow restrictors protect the system against the consequences of possible injector leakage.

An optional pressure limitation valve prevents excess pressure in the system. The fuel is squirted into the combustion chamber via the nozzle of the injector which is controlled by a solenoid valve.

The injector receives its switching signal from the electronic control unit. The quantity of fuel injected is determined by the electronically controlled system pressure, the activation time of the solenoid valve and the nozzle cross-section. The control unit evaluates all relevant engine and environmental conditions detected in the system and precisely defines the start of injection and the injected quantity required for thrifty, low-pollution engine operation. In addition to these basic functions there are also a wide range of functions designed to ensure ride comfort.

Increasing the fuel pressure to a level of up to 1350 bar enhances fuel consumption and thus reduces above all the formation of black smoke. At the same time, it is possible to increase the engine torque in the lower engine-speed range.

To comply with the exacting safety requirements, the system automatically provides compensation for and corrects any faults in the system components and permits where necessary exact diagnosis of both the injection system and the engine.

Optional interlinking with other electronic vehicle components can be effected by way of the high-speed CAN data bus.

Detailed information will be provided in the vehicle-specific diagnosis instructions currently being prepared. An article on "CR for passenger vehicles" is also to be published in the "Bosch Technical Information" series (ref. no. 1 987 722 054).

2. CUSTOMERS, VEHICLE MODELS, LAUNCH DATES, MARKETS

The following vehicle manufacturers have already equipped their vehicles with a CR system:

- * Alfa Romeo 156
as standard in Europe since 02.98
- * Mercedes Benz C 220 CDI
as standard in Europe since 02.98

The following vehicle manufacturers are also planning series introduction in 1998:

- * Mercedes Benz A 170 CDI
planned for Europe as of 09.98
- * BMW 5 Series, 7 Series
planned for Europe as of 09.98

3. SERVICE INFORMATION

3.1 Equipment data

Bosch Service Stations will be informed with ESI and CD-A about the system components currently available.

3.2 Service information "New product"

No "New product" service information has been compiled.

The Technical Information (1 987 722 054) has been published instead.

3.3 Trouble-shooting instructions (vehicle)

The vehicle trouble-shooting procedure will be described in detailed instructions.

The following publications are envisaged:

- * Alfa Romeo 156
CD-S 98/5 planned
- * Mercedes Benz C 220 CDI
CD-S 98/5 planned
- * Mercedes Benz A 170 CDI
CD-S 99/4 planned
- * BMW 5 Series, 7 Series
CD-S 99/4 planned

3.4 Testing and repair instructions for CR components

(e.g. injector, high-pressure pump)

Decentralized testing and repair of CR components at Bosch Service Stations or other service stations is not envisaged at present for technical reasons. This means that for the time being it is only possible to replace the complete injector and high-pressure pump.

4. REPLACEMENT PARTS

4.1 Europe

All system components subject to replacement will be available from KH (Bosch distribution center in Karlsruhe (VZK)).

Exception: "End of Line"(EoL)-programmed control units cannot as yet be supplied ready for installation by KH. The control units will be marked appropriately in our equipment documentation (CD-A).

Bosch subsidiaries/agents abroad should draw up appropriate replacement-part schedules on the basis of the respective market situation/stocks on call.

4.2 USA and Canada

The replacement-part supply concept for North America is to be coordinated with Bosch USA. Stocks will be based on the corresponding vehicle sales figures.

5. EXCHANGE SYSTEM

System components suitable for exchange within the scope of a conventional exchange system will be offered as new items at special prices in the launch phase. It will not be possible to establish an exchange line for CR components until a sufficiently large volume of items returned is available. The exchange products currently on offer can be seen from our equipment documentation (CD-A).

6. TROUBLE-SHOOTING, TESTING AND REPAIR

6.1 Vehicle trouble-shooting

With trouble-shooting instructions:

Bosch Service Stations will be receiving vehicle-specific trouble-shooting instructions describing vehicle trouble-shooting procedures (refer to 3.3).

Envisaged KTS 300 test software publications:

- * Alfa Romeo 156
CD-S 98/4 planned
- * Mercedes Benz C 220 CDI
CD-S 98/3 planned
- * Mercedes Benz A 170 CDI
CD-S 99/4 planned
- * BMW 5 Series, 7 Series
CD-S 99/4 planned

6.2 Testing and repair concept

6.2.1 High-pressure pump

Testing of the high-pressure pump on an injection-pump test bench is not envisaged at present.

In the interim period defective high-pressure pumps can be replaced in a warranty situation by Bosch Service Stations with an exchange high-pressure pump (new item).

The defective high-pressure pump is to be sent for examination to Bosch Quality Assurance (K5/QSG) where fault statistics on this system will be kept.

This will enable any necessary improvements to be implemented without delay.

6.2.3 Other components
(e.g. injectors, temperature
sensors, speed sensors etc.)

These components can be replaced as complete units (no repairs). Repairs to individual system components would not be economically viable.

7. TEST SPECIFICATIONS

Test specifications (set values) for the electronics will be provided with the KTS 300 test software and the vehicle-specific trouble-shooting instructions.

8. SERVICE TOOLS

8.1 Vehicle trouble-shooting

Tools are currently being prepared for the removal and installation of system components in the various vehicles. Appropriate information can be found in the vehicle-specific trouble-shooting instructions.

9. STAFF TRAINING

The range of courses at the Bosch Training Center in Wernau is to be extended to include instruction relating to the diagnosis of CR systems for diesel engines.

The courses will be offered as of 01.1999.

The content of these training courses will be adapted as soon as any technical modifications are made to the service concept for CR systems.

10. WARRANTY PROCEDURE

Warranty assessments for system components can be made by Bosch Service Stations on the basis of the diagnosis instructions. Testing of individual components is not envisaged at present.

Remuneration for defective components will be handled in the usual manner.

In Germany:

During the warranty period, components about which complaints are received are to be sent together with warranty/goodwill claim (G20) and delivery note KH/VKD3-15333 to K5/QSG for warranty assessment.

Bosch Service Stations in Germany can find the address for shipment in the warranty handbook.

Outside Germany:

Components about which complaints are received are to be sent together with warranty/goodwill claim (G21) to the local Bosch representative.

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(KH/VKD 2)**

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GOVERNORS AND
DISTRIBUTOR PUMPS
WITH TORX-PLUS BOLT

Workshop: EP
04.1998
SI 0615 En

CARB lead seal

The new Torx-Plus bolt has been factory-fitted for some time to provide tamper-proof attachment of closing covers, LDA covers and caps on governors and distributor pumps. The special features of this bolt are as follows:

- * 5 slots in bolt head
- * 1 pin in the center of the five slots in the bolt head

A special screwdriver is needed for tightening/unfastening this bolt. To ensure that products featuring this bolt correspond to the original ex-factory condition, this bolt is not to be introduced as a service item. The screwdriver required will therefore also not be available as a special tool.

If necessary as part of service work, this bolt is to be unfastened in the same manner as for normal shear-off bolts. The replacement parts lists will not contain Torx-Plus bolts but rather the same shear-off bolts as previously.

Following repair and re-adjustment of a fuel-injection pump it is to be ensured that the head of this bolt is machined off.

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NEW DATE OF MANUFACTURE

Workshop:
EP, EL, NB
05.1998
SI 0617 En

With immediate effect, new K-sector products are being given a non-encoded date of manufacture (FD).

The following alternatives are envisaged:

1. Daily date of manufacture

This consists of the respective two-digit number for year, month and day, e.g.:

98 - 04 - 29 for 29.04.1998.

The daily date of manufacture may also be supplemented (in a second line) by the shift code, e.g.

98 - 04 - 29 for 29.04.1998 plus 1000 for 1st shift on 29.04.1998, with no additional information.

Additional information may be given in digits 2 to 4 after the shift code, e.g.:

1342 = 1st shift with additional data on production line and other internal details.

2. Quarterly date of manufacture

This consists of the respective two-digit number for the year and the first month in the quarter, e.g.:
98 - 04 for the second quarter of 1998.

Products released before March 1998 which are still in series production will still be marked with the date of manufacture using the old encoded method, however until the end of 2007 at the latest.

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INJECTION-PUMP
ASSEMBLY

Workshop: EP
07.1998
ST 0623 En

0 400 195 ...
0 400 196 ...

(M-pump with EDC positioner RE 22
for Mercedes-Benz passenger vehicles)

Note: This Service Telegram supplements
ST 0594 dated 02.1998 with the same
title/replaces the information
contained in it on positioner
repair work.

PROCEDURE:

The stated injection-pump versions
are installed in Mercedes-Benz vehicles
of series 202..., 210..., 140...
and 463....

Engines: OM 605.91/..96
OM 606.91/..96

Service Telegram 0594 provided infor-
mation on the complaint "sporadic
cut-out of engine" for the above
vehicles and indicated that the cause
of the trouble could possibly be the
electrical connection of the
positioner.

CAUSE OF TROUBLE

Fault analysis has revealed that contact resistances occurring in the crimping area of the soldering tags at the rack position sensor leads in the RE positioner may cause the problem described.

THE STIPULATION CONTAINED IN ST 0594 TO THE EFFECT THAT THE ENTIRE LEAD AND CONTACT PLATE ARE TO BE REPLACED IF THE POSITIONER IS THE CAUSE OF THE TROUBLE THUS NO LONGER APPLIES.

Proceed as follows if trouble-shooting in the vehicle clearly indicates a positioner fault:

FAULT RECTIFICATION, SOLDERING SPECIFICATION

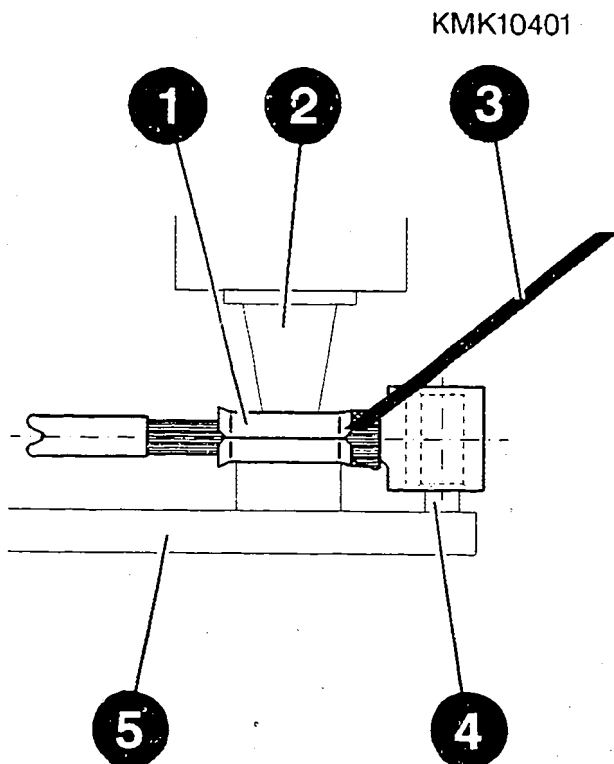
After dismantling the positioner cover, the crimp connections of the rack position sensor leads are to be additionally soldered on the sensor and connector ends.

As regards soldering equipment and instructions, reference is made to the detailed information given in the test and repair instructions for M/RE 22 positioners. Particular attention is to be paid to the correct soldering-iron tip temperature (350...370 C). Otherwise, use is to be made of a solder wire with integrated flux, diameter approx. 1 mm.

**FAULT RECTIFICATION/SOLDERING
SPECIFICATION**
(continued)

Perform soldering work with extreme care. Thoroughly clean soldered joints (crimp and wire bundle) with acetone. Only solder on soldering tag side, not over entire crimp length (so as not to impair flexibility of wiring). Apply soldering iron to side of crimp (Fig.) and only heat to the extent required to cause solder to flow into wire bundle.

- 1 = Crimp
- 2 = Soldering-iron tip
- 3 = Solder wire
- 4 = Soldering pin in contact plate
- 5 = Contact plate



FAULT RECTIFICATION/SOLDERING
SPECIFICATION
(continued)

Note:

- Avoid excessively long heating of the soldered joint so as not to melt the contact plate.
- If the temperature is too low, the soldered joint remains cold and electrical connection is not guaranteed.
- The wire bundle should be completely filled with solder at the soldered joint and covered, but it should not form a firm link with the soldering tag.
- On completion of work, check soldering result with magnifying glass.

FAULT RECTIFICATION/SOLDERING
SPECIFICATION
(continued)

Final inspection and, if necessary, adjustment of the assembly on the EP test bench must be performed.

WARRANTY

The standard warranty conditions apply to the EP-assembly repair work described:

- Warranty claims form G 20/G21
- Coupon C
- Fault description A 13
To be entered left-justified with no blank spaces

Published by:

Robert Bosch GmbH
Division KH
After-Sales-Service Department for
Training and Technology (KH/VSK)

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VE PUMP FOR
VOLVO PENTA MARINE ENGINES

Workshop: EP
08.1998
ST 0628 En

Drop in pressure
inside pump

A drop in pressure inside the pump affecting the timing device may occasionally be encountered with Volvo Penta engines of series 31 to 43.

Depending on the magnitude of the drop in pressure, this may result in loss of power.

This problem only affects the VE pumps listed with dates of manufacture between November 1997 (FD 771) and January 1998 (FD 861)

VOLVO Penta VE pumps affected:

Volvo Penta no. : 861 621
Bosch part no. : 0 460 424 106*
Type designation: VE 4/12 F 2050 L 607
Date of manuf. : FD Nov. -97 / "771"
Engine type used: 31P

Volvo Penta no. : 3581 433
Bosch part no. : 0 460 426 218
Type designation: VE 6/12 F 1950 I 527
Date of manuf. : FD Nov. -97 / "771"
Engine type used: 41P

Volvo Penta no. : 861 621
Bosch part no. : 0 460 424 106*
Type designation: VE 4/12 F 2050 L 607
Date of manuf. : FD Dec. -97 / "772"
Engine type used: 31P

Volvo Penta no. : 861 621
Bosch part no. : 0 460 424 106*
Type designation: VE 4/12 F 2050 L 607
Date of manuf. : FD Jan. -98 / "861"
Engine type used: 31P

Volvo Penta no. : 3581 917**
Bosch part no. : 0 460 424 163
Type designation: VE 4/12 F 1900 L 776
Date of manuf. : FD Jan. -98 / "861"
Engine type used: 32P

Volvo Penta no. : 3581 433
Bosch part no. : 0 460 426 218
Type designation: VE 6/12 F 1950 L 527
Date of manuf. : FD Dec. -97 / "772"
Engine type used: 41P

Volvo Penta no. : 3581 433
Bosch part no. : 0 460 426 218
Type designation: VF 6/12 F 1950 L 527
Date of manuf. : FD Jan. -98 / "861"
Engine type used: 41P

Volvo Penta no. : 3581 564
Bosch part no. : 0 460 426 219
Type designation: VE 6/12 F 1950 L 528
Date of manuf. : FD Dec. -97 / "772"
Engine type used: 42/43P

Volvo Penta no. : 3581 564
Bosch part no. : 0 460 426 219
Type designation: VE 6/12 F 1950 L 528
Date of manuf. : FD Jan. -98 / "861"
Engine type used: 42/43P

* = Pump 0 460 424 106 is also the basic pump for 3581 451-X01 (VE 4/12 F 2050 L 607-1) for the engine 32P.

** = Pump 3581 917 is a new version for the 32P engine.

National Volvo Penta Service departments have been informed accordingly. Volvo Penta dealers have been instructed to take VE pumps of engines with the above symptom to their nearest Bosch Service Station for incoming inspection.

If incoming inspection reveals the timing device travel to be outside the valid check tolerance, the VE pump is to be replaced as a complete unit within the warranty period. Individual repairs would not be viable. Replacement is to be performed free of charge for customers and billed under warranty.

For reimbursement purposes, the faulty pump is to be sent to BOSCH together with the completed test record and the warranty claim.

The following entries are to be made on the warranty claims form G20/G21:

Fault number	:		DE
Warranty type	:		0
C-part	:	Job card number	
Plain language:		V0398-Penta	
Field 80	:		"X"

In Germany, Bosch Service Stations should send the pump and documentation to:

Robert Bosch GmbH
Fe W/LOG3 - Auspackraum
z. W. an K5/QSG1
Wernerstraße 51
70 469 Stuttgart

Bosch Service Stations outside Germany should send the pump and warranty claim (G21) to their local BOSCH representative.

Published by:

ROBERT BOSCH GMBH
Division KH
Technical After-Sales Service
(KH/VKD 2)

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concerning the contents to our
authorized representative in your
country

Complaints about constant-pressure
valves

The cone of the constant-pressure valve may occasionally rupture on in-line pumps of sizes P, H and R. This can lead to rough engine running, loss of power and smoke formation. All constant-pressure valves may be subject to the above problems. The item number of the constant-pressure valve in the service parts list for all the above-mentioned pumps is 13.

To help identify the constant-pressure valves, the part number range is indicated below:

For size P:

Constant-pressure valve 2 418 559 ...

For size H:

Constant-pressure valve 2 418 529 ...

For sizes R and P:

Constant-pressure valve 2 418 549 ...

In the event of a complaint, all constant-pressure valves on the in-line pump are to be replaced. As minute particles of the ruptured constant-pressure valve could ingress into the injection tubing/nozzle-holder assembly (DHK) and cause subsequent damage, it is appropriate to also renew the DHK at the port at which the ruptured constant-pressure valve was replaced as a precautionary measure.

The injection tubing of the port concerned is to be carefully cleaned (blow out with compressed air, visually inspect sealing cone).

Customers are to be informed in writing about the rupture of the constant-pressure valve as well as the need for cleaning the injection tubing and replacing the DHK.

Use can be made for this purpose of the test record for Bosch in-line pumps in which a note is to be made concerning rupture of the constant-pressure valve and the need for cleaning of the tubing/DHK replacement.

The work is to be performed free of charge during the warranty period.

The warranty claim is always to be filed under fault number 22.

The chassis number of the vehicle in question is also to be indicated in plain language.

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NEW PRODUCT

Workshop: EP

11.1998

Solenoid-valve control
distributor injection pumps
with EDC system

SI 0618 En

Ever more stringent demands in terms of emissions, economic viability and ride comfort led to the further development of the electronically controlled distributor injection pump for passenger vehicle and light truck engines.

Two new types of distributor injector pump were developed to cover the requirements of the widest possible range of Diesel engines:

VE..M.. (VP 29/30) and
VR..M.. (VP 44)

The major distinguishing features of these new types as opposed to previous distributor injector pumps are as follows:

- * Solenoid-valve high-pressure control, thus obviating the need for control collar
- * Built-on control unit

* Solenoid-valve angle/time control

* Optimal efficiency

Advantages of new solenoid-valve control distributor injection pumps:

* High degree of fuel quantity accuracy by way of individual compensation at several points on the map in the control unit

* Independent choice of start of injection and plunger lift to port closing

* Injected fuel-quantity correction for each cylinder right through to high engine-speed ranges

* Highly dynamic quantity control and rapid fuel delivery termination via high-pressure solenoid valve

* Timing-device range not governed by number of cylinders

* Provision for pilot injection

* High injection pressures thanks to optimal efficiency

Advantages of direct control-unit attachment:

- * Compact arrangement of engine and pump control units
- * Immediate transfer of operating parameters calculated in engine control unit to pump control unit by way of data bus (data required with regard to start of injection, start of delivery and delivery quantity).
- * Direct actuation of high-pressure solenoid valve in distributor injection pump without external cable link.

Brief description of new pump types:

1. VE..M..(solenoid-valve control)

This injection pump is basically the same as the electronically controlled axial-piston pump VE..E..., however fuel delivery is controlled by way of a solenoid valve integrated into the pump. There is no control collar or solenoid-operated shutoff (ELAB). This type of pump is used for pre-chamber and whirl-chamber Diesel engines, as well as direct-injection engines with medium-range injection pressures. With the exception of the built-on control unit, the outer dimensions correspond to those of conventional pumps.

2. VR..M..(radial-piston pump, solenoid-valve control)

This injection pump is designed for direct-injection engines with more exacting demands in terms of injection pressure and resultant hydraulic performance.

The mechanical drive section consists, amongst other components, of a number of radial pistons governed by the number of cylinders. Consequently, the pump is shorter but somewhat wider and taller than the previously released pump VE..E..

The drive shaft is fitted with a trigger wheel (fixed) and a sensor retaining ring (movable), which together make up the incremental angle/time system (IWZ). The sensor of the retaining ring is connected to the pump control unit by way of a conductive foil.

The cam ring in the pump replaces the previous cam plate and provides the radial piston with the stroke required to build up the high pressure in the fuel.

The inside of the cam ring features a cam track with cam lobes corresponding to the number of cylinders. The ring is swivel-mounted in the pump housing.

It is connected by way of a knuckle pin to the timing-device piston. The axial movement of the timing-device piston is thus converted into cam ring rotation.

Both pump versions feature a high-pressure solenoid valve located centrally in the distributor head. The solenoid valve is closed by means of a control pulse from the pump control unit. Fuel delivery is maintained as long as the solenoid valve remains closed. The fuel in the element chamber is routed by way of a connecting port to the delivery valve.

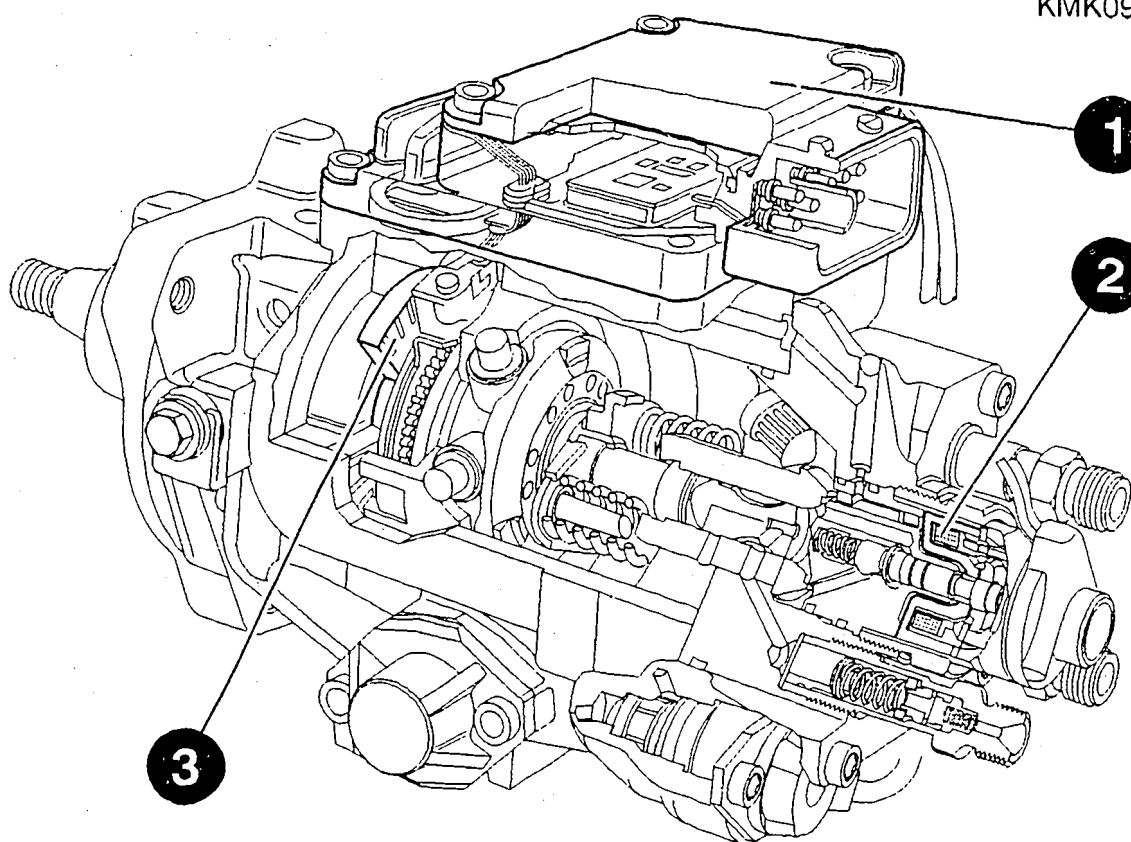
From there it is routed in the usual way to the engine for injection. Opening of the solenoid valve terminates the high-pressure delivery and delivery is thus completed. The quantity delivered is therefore governed by the length of time for which the solenoid valve is closed.

Sectional view of VE..M.. (VP 29/30)

1 = Control unit

2 = Solenoid valve

3 = Angle-of-rotation sensor (DWS)

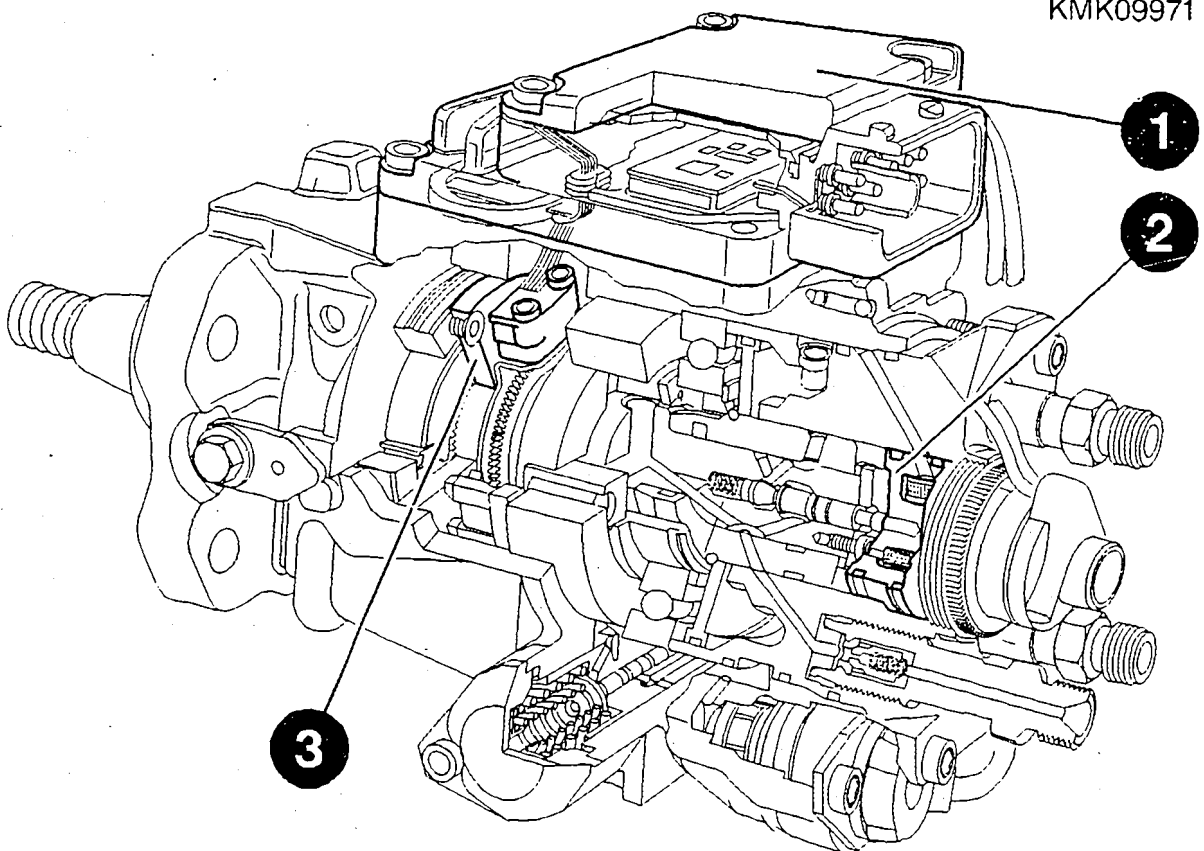


KMK09970

Sectional view of VR..M.. (VP 44)

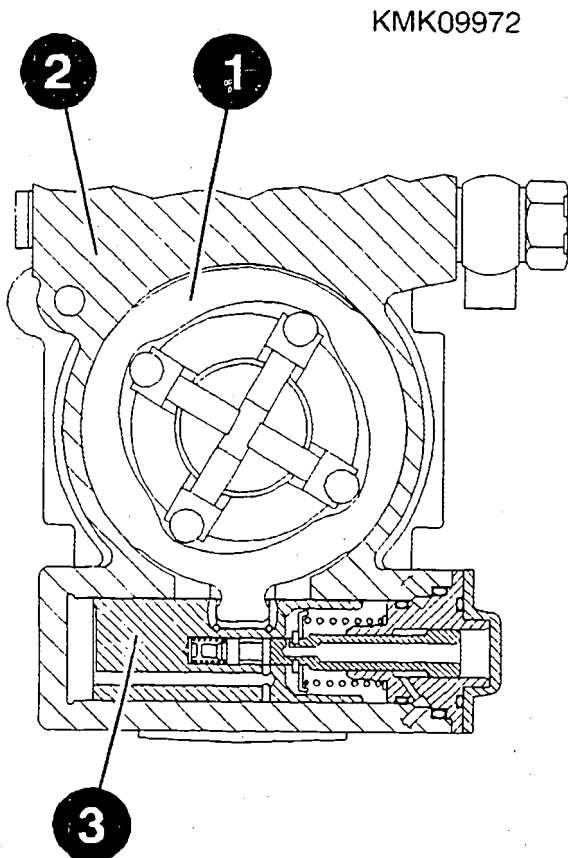
- 1 = Control unit
- 2 = Solenoid valve
- 3 = Angle-of-rotation sensor (DWS)

KMK09971



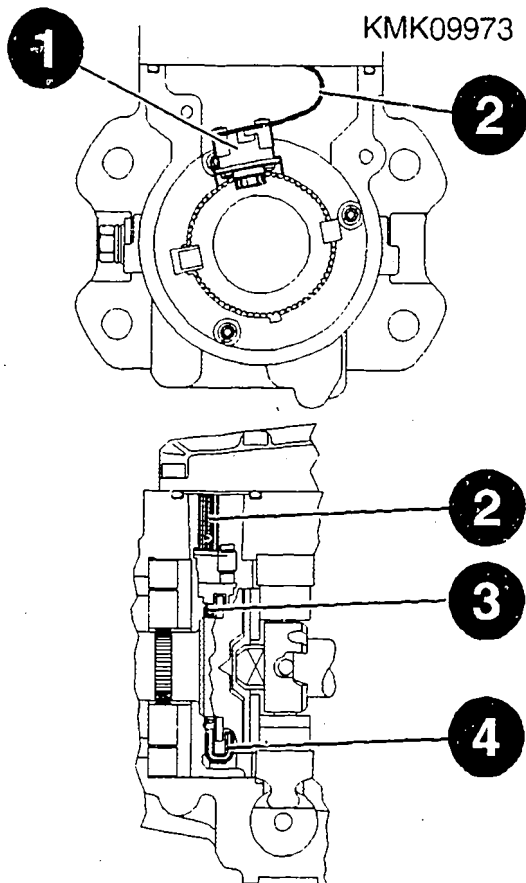
VR..M.. (VP 44)
Cam ring with timing device

- 1 = Cam ring
- 2 = Pump housing
- 3 = Timing device with trailing piston



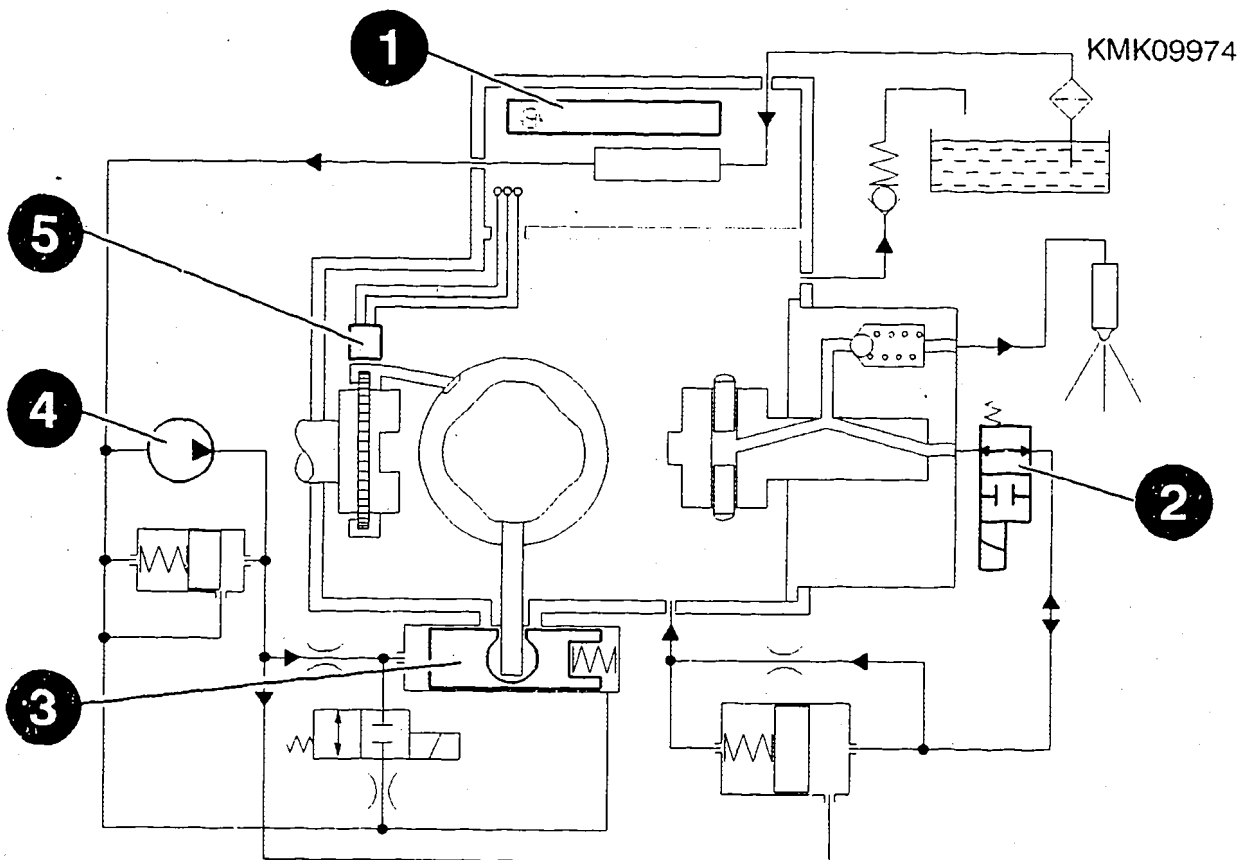
VR..M.. (VP 44)
Incremental angle/time system (IWZ)

- 1 = Magnetoresistive sensor
- 2 = Conductive foil
- 3 = Bearing ring
- 4 = Driver



VR..M.. (VP 44)
Incremental angle/time system (IWZ)
Operating principle

- 1 = Pump control unit
- 2 = Fuel-quantity solenoid valve
- 3 = Timing device
- 4 = Fuel supply pump
- 5 = Angle-of-rotation sensor (DWS)



Service information:

Until further notice, damaged injection pumps are to be replaced as complete assemblies during and after warranty period.

Appropriate instructions are currently being prepared for product repair, testing and adjustment and these will be issued accordingly.

Published by:

Robert Bosch GmbH
Division KH
After-Sales-Service Department for
Training and Technology (KH/VSK)

Please direct questions and comments concerning the contents to our authorized representative in your country.

NOZZLE-AND-HOLDER ASSEMBLY Workshop: EP
with two pressure springs 10.1998
(2-F-DHK) or stepped ST 0632 En
nozzle-holder assembly (STH) for
modern high-powered Diesel engines

Testing and repair ban for
2-F-DHK and STH

BOSCH developed the 2-F-DHK and the STH
to further enhance the noise and
emission levels of modern Diesel
engines.

Increasing injection pressures and
design constraints mean that it is no
longer possible to test and repair
such nozzle-holder assemblies.

Reasons:

- * The second opening pressure of the
2-F-DHK cannot be checked and
adjusted with the standard nozzle
tester.
- * Nozzle-holder assemblies with needle
motion sensors (NBF) have not been
repaired to date.

* Use is made of the so-called stepped nozzle on account of the high pressures at the nozzle. As a result, the nozzle can no longer be centered at the workshop, as this could lead to nozzle damage and possibly problems with the engine.

BOSCH currently do not permit nozzle replacement for the above-mentioned nozzle-holder assemblies.

All nozzles have been banned from sale.

SUCH NOZZLE-HOLDER ASSEMBLIES MUST BE REPLACED BY BOSCH NEW OR FACTORY EXCHANGE DHK.

This does not affect conventional 1-spring nozzle-holder assemblies which can still be repaired as part of service work.

The assignment of nozzles/nozzle holders to nozzle-holder assemblies (nozzle + holder) will be given in ESI in future.

The 1999 edition of the sales catalog "Factory exchange for Diesel injection systems" is currently being prepared in parallel with this.

Expected completion date: mid. '99.

An up-to-date list of currently available nozzle-holder assemblies is enclosed with this Service Telegram as hard copy and can also be obtained from

Robert BOSCH GmbH
Geschäftsbereich KH
Abt. KH/VPT
Fax 0721 942 3527

Published by:

ROBERT BOSCH GMBH
Division KH
Technical After-Sales Service
(KH/VKD 2)

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SIZE MW INJECTION-PUMP
ASSEMBLIES (EPK)
WITH RQV GOVERNOR

Workshop: EP
03.1999
SI 0641 En

Customer complaint: Engine vibration in
part-load range and rough idling

Proposed modification of governor RQV
to RQ on Mercedes-Benz commercial
vehicles with engine OM 364 LA

The following may be affected:

EPK	0	403	244	045
Pump	0	413	204	021
Governor	0	420	083	329
Fuel-supply pump	0	440	017	037

EPK	0	403	244	046
Pump	0	413	204	022
Governor	0	420	083	330
Fuel-supply pump	0	440	017	037

EPK	0	403	244	047
Pump	0	413	204	022
Governor	0	420	083	330
Fuel-supply pump	0	440	017	043

EPK	0	403	244	048
Pump	0	413	204	021
Governor	0	420	083	329
Fuel-supply pump	0	440	017	043

EPK	0	403	244	050
Pump	0	413	204	022
Governor	0	420	083	331
Fuel-supply pump	0	440	017	043

EPK	0	403	244	051
Pump	0	413	204	022
Governor	0	420	083	331
Fuel-supply pump	0	440	017	037

EPK	0	403	244	052
Pump	0	413	204	021
Governor	0	420	083	332
Fuel-supply pump	0	440	017	037

EPK	0	403	244	053
Pump	0	413	204	021
Governor	0	420	083	332
Fuel-supply pump	0	440	017	043

For this EPK the governor is to be converted from version RQV to RQ. Modification and setting will take the form of a variant on the respective basic pump.

The modified variant is to be marked with an additional letter behind the EPK (refer to "Marking of modified EPK").

Modification is covered by the repair instructions W-400/.. for RQ/RQV governors.

To keep vehicle off-road times to a minimum, the parts required for governor modification are to be obtained in advance by Bosch Service Stations.

This will require detailed scheduling on the part of the Daimler-Chrysler organization and Bosch Service Stations.

Modification procedure:

1. Incoming inspection of pump on test bench and compilation of test record
2. Modification of governor
3. Setting of pump on test bench
4. Marking of modified pump
Incoming and outgoing inspection values are to be listed in an injection-pump test record.

The following parts are required for the appropriate governor modification work:

1. Governor from RQV 0 420 083 329
to RQ 0 420 082 081

2. Governor from RQV 0 420 083 330
to RQ 0 420 082 078

Modification parts:

1 x Bearing pin	1	423	521	014
1 x Var.-fulc. lever	1	422	033	062
1 x Flyweight assy.	2	428	199	080
1 x Linkage lever	2	422	001	024
1 x Setting shaft	1	423	002	102
1 x Shim	1	420	103	032
1 x Shim	1	420	103	033
1 x Shim	1	420	103	034
1 x Shim	1	420	103	035
1 x Shim	1	420	103	036
1 x Shim	1	420	103	037
1 x Shim	1	420	114	009
1 x Shim	1	420	114	010
1 x Shim	1	420	114	011
1 x Shim	1	420	114	012
1 x Shim	1	420	114	013
1 x Spacer ring	2	420	200	011
1 x Spacer ring	2	420	200	012

1 x Spacer ring	2	420	200	013
1 x Spacer ring	2	420	200	014
1 x Spacer ring	2	420	200	015
1 x Spacer ring	2	420	200	016
1 x Spacer ring	2	420	200	017
1 x Spacer ring	2	420	200	018
1 x Spacer ring	2	420	200	019
1 x Spacer ring	2	420	200	020
1 x Spacer ring	2	420	200	025
1 x Spacer ring	2	420	200	026
1 x Spacer ring	2	420	200	027
1 x Spacer ring	2	420	200	028
1 x Spacer ring	2	420	200	029
1 x Spacer ring	2	420	200	030
1 x Spacer ring	2	420	200	031
1 x Spacer ring	2	420	200	032
1 x Spacer ring	2	420	200	033
1 x Spacer ring	2	420	200	034

(selection as required)

2 x Spring seat	1	420	500	010
2 x Compress. spring	1	424	617	037
2 x Compress. spring	2	424	633	011
2 x Compress. spring	2	424	640	011
2 x Spring seat	2	420	520	004
2 x Spacer bushing	1	420	313	000
2 x Spacer bushing	2	420	300	050
2 x Spacer bushing	2	420	300	046
2 x Spacer bushing	2	420	300	047
2 x Spacer bushing	1	420	313	005
2 x Spacer bushing	2	420	300	048
2 x Spacer bushing	2	420	300	049
2 x Spacer bushing	2	420	300	051
2 x Spacer sleeve	1	420	400	000
2 x Spacer bushing	2	420	300	052
2 x Spacer bushing	2	420	300	053
2 x Spacer sleeve	1	420	400	001
2 x Spacer sleeve	1	420	400	002
2 x Spacer sleeve	2	420	300	061

(selection as required)

2 x Compress. spring	2	424	619	177
1 x Shim	1	420	100	606
1 x Shim	1	420	100	607
1 x Shim	1	420	100	608
1 x Shim	1	420	100	609
1 x Shim	1	420	100	610
1 x Shim	1	420	100	611
1 x Shim	1	420	100	614

(selection as required)

2 x Spring retainer	1	420	521	032
6 x Shim	1	200	102	624
4 x Shim	1	420	101	023
2 x Shim	2	420	101	027

3. Governor from RQV	0	420	083	332
to RQ	0	420	082	080

4. Governor from RQV	0	420	083	331
to RQ	0	420	082	079

Modification parts:

1 x Bearing pin	1	423	521	014
1 x Var.-fulc. lever	1	422	033	062
1 x Flyweight assy.	2	428	199	080
1 x Linkage lever	2	422	001	024
1 x Setting shaft	1	423	002	102

1 x Shim	1	420	103	032
1 x Shim	1	420	103	033
1 x Shim	1	420	103	034
1 x Shim	1	420	103	035
1 x Shim	1	420	103	036
1 x Shim	1	420	103	037

1 x Shim	1	420	114	009
1 x Shim	1	420	114	010
1 x Shim	1	420	114	011
1 x Shim	1	420	114	012
1 x Shim	1	420	114	013
1 x Spacer ring	2	420	200	011
1 x Spacer ring	2	420	200	012
1 x Spacer ring	2	420	200	013
1 x Spacer ring	2	420	200	014
1 x Spacer ring	2	420	200	015
1 x Spacer ring	2	420	200	016
1 x Spacer ring	2	420	200	017
1 x Spacer ring	2	420	200	018
1 x Spacer ring	2	420	200	019
1 x Spacer ring	2	420	200	020
1 x Spacer ring	2	420	200	025
1 x Spacer ring	2	420	200	026

1 x Spacer ring	2	420	200	027
1 x Spacer ring	2	420	200	028
1 x Spacer ring	2	420	200	029
1 x Spacer ring	2	420	200	030
1 x Spacer ring	2	420	200	031
1 x Spacer ring	2	420	200	032
1 x Spacer ring	2	420	200	033
1 x Spacer ring	2	420	200	034

(selection as required)

2 x Spring seat	1	420	328	018
2 x Compress. spring	1	424	618	047
2 x Compress. spring	2	424	633	002
2 x Compress. spring	2	424	640	011
2 x Spring seat	2	420	520	004
4 x Shim	1	200	102	623
2 x Shim	1	420	101	622
2 x Shim	1	420	101	027

TEST SPECIFICATIONS

The test specifications will be published with the next CD-W issue.

In Germany, current test specifications can be called up by fax via BTX.

In all other countries, enquiries are to be addressed to the appropriate subsidiary abroad/local representative.

MARKING OF MODIFIED INJECTION PUMPS

After modification, the letter B is to be marked on the pump rating plate after the assembly number.

Example:

EPK 0 403 244 045

Please mark with a B:

0 403 244 045B

0 403 244 046B etc.

OUTLAY AND COSTS

All work is subject to charge.
Use is to be made of the currently
valid work units for modification
of the governor.

Published by:

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Division KH
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Changes to warranty procedure in the case of delivery problems

To date, delivery problems with in-line fuel-injection pumps were still acknowledged under Bosch warranty conditions and the costs appropriately remunerated even if the pumps were provided with a vehicle or engine manufacturer's seal.

With immediate effect, delivery problems on Bosch injection pumps with vehicle or engine manufacturer's seal are no longer to be acknowledged under Bosch warranty conditions and there will be no remuneration of costs. The Technical Bulletin "Provision of seal by engine manufacturer" (refer to microcard W-400/003, B05) of 08.1978 is thus rendered invalid.

Fault number 15 ("Full load delivery not OK") is thus no longer valid and claims of this type can no longer be accepted.

If the delivery rate of Bosch injection pumps with Bosch seal is outside the inspection tolerance (value in parentheses) during the warranty period, costs will only be remunerated in response to a warranty claim if the Bosch test record is submitted to the appropriate office together with the warranty claim.

In Germany:
Robert Bosch GmbH, Abt. KH/VKD3,
Auf der Breit 4,
76 225 Karlsruhe.

In all other countries:
To the appropriate local
representative.

The initial injection pump values listed in the test record are then compared to the delivery rate values stored in the central quality master computer (QLR).
For this purpose the test record must additionally contain the six-position Bosch customer number, the job card number and the serial number of the pump about which the complaint has been received.

These data must be entered appropriately in the case of records printed out directly from the Bosch injection-pump test bench.

Costs cannot be remunerated under warranty without these data.

Further details can be found in the appropriate warranty information from KH/VKD3 and in the warranty manual.

Important information on warranty assessment

Warranty assessment of Bosch injection pumps remains subject to the following guidelines:

The test specifications given in the current service test specification sheets are definitive as regards the checking and adjustment of Bosch injection pumps. These are the only values accepted by our OEM customers and must be strictly observed.

Compliance with the accepted service test specifications is also a prerequisite as regards homologation and legally prescribed emission limits.

In the event of complaints about performance and consumption, the delivery rate can be set, for a charge, to the upper limit of the adjustment tolerance and optimum scatter. Warranty claims for adjustments of this nature cannot be entertained if the delivery and scatter did not exceed the inspection tolerance in the incoming inspection measurement.

The delivery must be assessed by way of a comparison of the arithmetic mean of all injection-pump ports (actual value) with the delivery tolerance (set value) given in the test specification sheet for checking of the arithmetic mean value (value in parentheses).

The scatter is assessed by way of comparison of the difference between the injection-pump port providing maximum delivery and the scatter stipulated for checking in the test specification sheet (value in parentheses).

If these values do not exceed the specified inspection tolerance (value in parentheses), no warranty cover can be claimed.

It is appropriate to evaluate delivery measurements using a pocket calculator as it is not always possible to judge at a glance whether the delivery tolerance indicated in the test specification sheet has been exceeded.

This is illustrated by the following example:

Set values from Bosch test specification sheet

- * Full load delivery setting:
126...128 cm³ per 1000 strokes
- * Full load delivery inspection value
(value in parentheses):
123.5...130.5 cm³ per 1000 strokes
- * Scatter check
(value in parentheses):
8 cm³ per 1000 strokes

Incoming inspection measurement actual values:

Port no.	Delivery in cm ³ per 1000 strokes
1	122
2	122
3	130
4	124
5	123
6	122
7	123
8	124
9	123
10	122

Arithmetic mean actual value

$$\begin{aligned} & \text{Sum total of delivery of all} \\ & \text{ports (barrels)} \\ = & \text{-----} \\ & \text{Number of ports (barrels)} \end{aligned}$$

$$\begin{aligned} = & \frac{1235 \text{ cm}^3}{10} = 123.5 \text{ cm}^3 \end{aligned}$$

Actual scatter:

= Difference between maximum and minimum delivery value of individual ports

$$= 130 \text{ cm}^3 - 122 \text{ cm}^3 = 8 \text{ cm}^3$$

The injection pump in this example is within the inspection tolerances of the test specification sheet as regards delivery and does not therefore represent a warranty situation.

Although in this example individual ports are outside the inspection tolerance for the arithmetic mean, the pump delivery is OK, as the arithmetic mean is within the set value for the inspection tolerance.

In other words, the delivery adjustment and inspection tolerances listed in the test specifications are only valid in conjunction with the arithmetic mean, which is not to be used for individual port assessment.

The "scatter" component ensures that the individual port remains within fixed delivery tolerances.

Documentation of pump measurement

The incoming and outgoing injection-pump inspection values are to be listed in the test record for injection pumps. The test record is to be submitted as a matter of course to the customer together with the properly sealed and protected injection pump (delivery valve holder, supply pump opening, end of camshaft, Woodruff key).

Documentation of the incoming inspection values is of particular significance as regards complaints concerning performance and/or consumption and forms the basis for any further investigation required.

The "Remarks" column should be completed with information permitting reconstruction of the service situation (complaint, work performed). A copy of the test record is to be kept for 6 years together with the job card.

Incoming inspection values need not be recorded if the as-delivered condition of an injection pump or the situation is such that incoming inspection would be of no relevance.

Published by:

ROBERT BOSCH GMBH
Division KH
Technical After-Sales Service
(KH/VKD 2)

Please direct questions and comments concerning the contents to our authorized representative in your country

AXIAL PISTON PUMP
(VE) VP29/30
0 470 000 000 -..499 999
AND

Workshop: EP
07.1999
SI 0647 En

RADIAL PISTON PUMP
(VR) VP44
0 470 500 000 -..999 999)

Field warranty procedures for new products

The Service Bulletin "Solenoid-controlled radial piston pumps VR..M.." dated 02.1998 outlined the service concept for the VP44 as used at present for example for Audi, BMW, Cummins, Ford, MAN, Opel, Rover and Volvo Truck.

As part of the service concept, Bosch Service Stations were informed that special notes on warranty handling procedures would be issued. These are contained in the following. The warranty information listed in the Service Bulletin will be distributed separately.

Warranty work for the pumps listed here is at present restricted to replacement of the defective pump. Bosch Service Stations will be remunerated in the usual warranty manner for the replacement pump issued to the customer. An information bulletin introducing the VP44 replacement program is currently being prepared.

The planned checking and repair of the VP44 by the Bosch Diesel Service organization envisaged for the start of 1999 has thus been postponed and is now scheduled for mid 2000. The Service tools required will be published in good time with the issuing of the test and repair concept. The same applies by analogy to the VP 29 (IDI applications) and the VP 30 (DI applications).

The following procedure is to be adopted before issuing customers with a replacement pump in warranty situations:

1. Check completeness of warranty data, e.g.:
 - * Date of manufacture (FD);
 - * Factory code (WSZ),
 - * In future: Division/factory number BWN;
 - * Date of purchase and fault
 - * Plain language description of reason for complaint in C-Section e.g. "Engine will not start"

* Entry of serial number for injection pumps

With immediate effect, the serial number must be entered in addition to the other data normally given when filling in the "Project/assembly no./device no." section of the request for warranty and goodwill coverage for injection pumps. This serial number generally has between 8 and 11 digits. The 11th digit may have to be omitted due to lack of space (fictitious example, 10 digits: 966123456A)

2. Visual inspection to check for manipulation, e.g. pump control unit, fuel quantity solenoid, timing device and delivery valve holders properly attached.

3. Drain pump and check for gasoline or water in pump. Warranty claims cannot be entertained if pump is contaminated with gasoline or water. Costs for replacement pumps issued are then to be billed.

As soon as a warranty situation occurs, the VP44 concerned is to be submitted together with the completed request for warranty coverage to the following address:

In Germany:

Robert Bosch GmbH
FeW/LOG3 - Auspackraum
z.W. an. K5/QSG1
Wernerstr.51
D-70469 Stuttgart

In all other countries, Bosch Service Stations should send the old part to their local Bosch representative.

Old parts not connected with warranty claims should be submitted to the following address:

Robert Bosch GmbH
K9-SI/ALP-Sauermann
Hagenweg 2
D-37081 Göttingen

In all other countries, Bosch Service Stations should send the old parts to their local Bosch representative.

Pay attention to the following before dispatching old part:

1. Close unions opened for draining pump.
2. Seal injection pump openings with protective caps and make sure transportation packaging is not dirtied or even softened up by leakage of any substances. Haulage companies may refuse transportation or claim damages if the pump is not packed such that it remains clean and dry.

3. Secure Woodruff key to stop it falling out (transportation sleeve)
Note:
For Cummins applications, the Woodruff key is specially matched to the individual pump and must therefore not be lost. Refer to separate Service Information if replacements are needed.
4. The old part must be accompanied by the completed request for warranty coverage in a fuel-resistant envelope.

Department responsible:

ROBERT BOSCH GMBH

Division KH

Service and Warranty (KH/KDGI)

Outside Germany, enquiries should be addressed to the appropriate local representative.

RQ GOVERNOR ON
INJECTION-PUMP ASSEMBLY
P 8000/RQ

Workshop: EP
07.1999
ST 0643 En

No soldered joint at fastening pin of
LDA plate in RQ governor for Scania
industrial engines
DSI 11 76M, 77M and DSC 11 58A

The fuel-injection pump governor on the
above-mentioned Scania engines may have
been fitted with LDA plates with a
manufacturing fault, i.e. no
soldered joint at fastening pin of
LDA plate.

A loose fastening pin may result in
the control rack being held on full-
load delivery and the engine being
revved up in an uncontrolled manner.

The LDA plates are therefore to be
replaced on the pumps concerned.

The following two fuel-injection pumps
are affected:

Scania part no. : 1 388 641
BOSCH part no. : 0 402 946 024
Production no. : 670 to 769

Scania part no. : 1 397 781
BOSCH part no. : 0 402 946 030
Production no. : 670 to 769

The following procedure has been agreed upon with Scania:

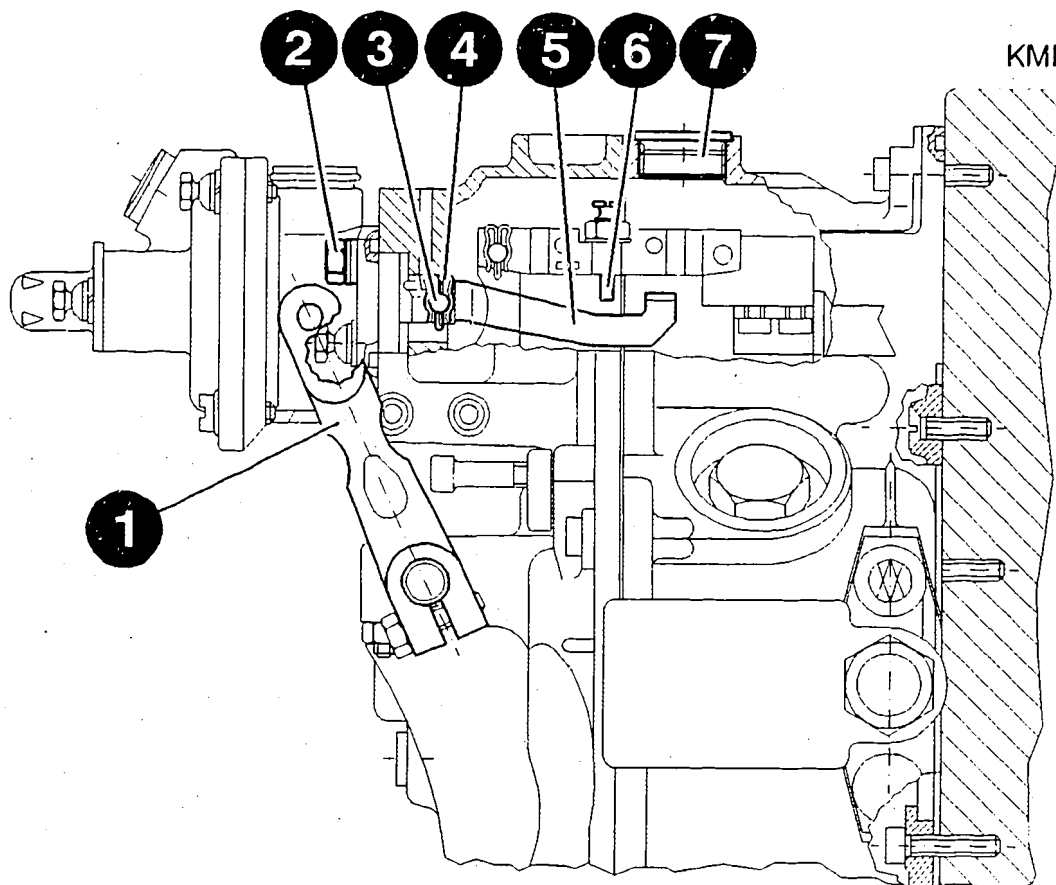
1. Fuel-injection pump to be submitted by Scania.
2. Conversion measure on removed fuel-injection pump to be performed by Bosch Diesel Service.
Conversion work free of charge for Scania and Bosch Service reimbursement through standard warranty channels.
3. Scania to inform its importers and dealers in writing of this measure.
4. Converted fuel-injection pump to be clearly marked with white dot at LDA.

I M P O R T A N T:

For safety reasons, particular attention is to be paid when replacing plate to installing it such that control rack is also pulled back. If this is not guaranteed, speed regulation break-away will not take place and the engine may race.

If injection pump is not delivered by Scania, but rather conversion work has to be performed on site (e.g. emergency generator in hospital, transmitters), check to establish whether LDA plate 1 421 335 042 has been soldered in at securing pin (item 3) must be performed by an experienced Bosch diesel specialist and involves the following procedure:

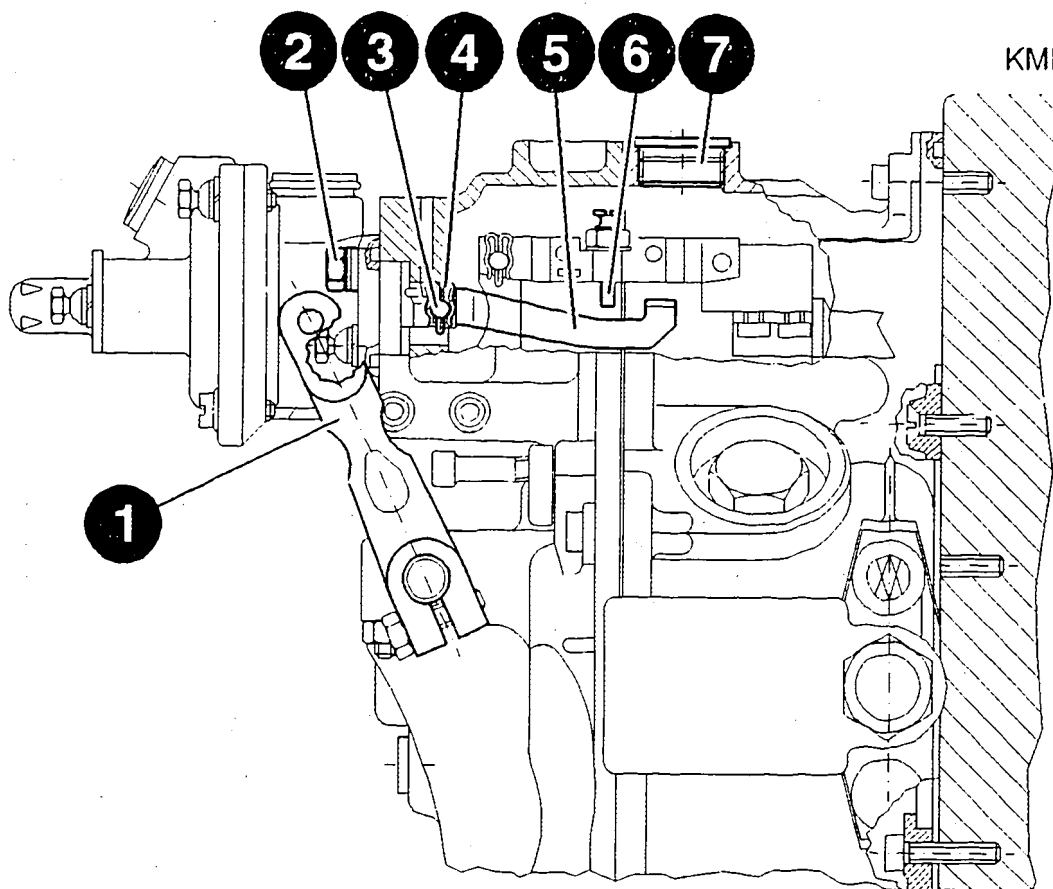
- * Detaching of injection pump from engine by Scania engine specialist/ attaching



KMK11881

- * Control-rack travel measurement
Attach control-rack travel measuring instrument to pump removed.
Establish and note down control-rack travel measured value V_S (full-load intake).
Apply 1.5 bar to LDA (e.g. using Duovac pump) and note down V_I (full-load control-rack travel).

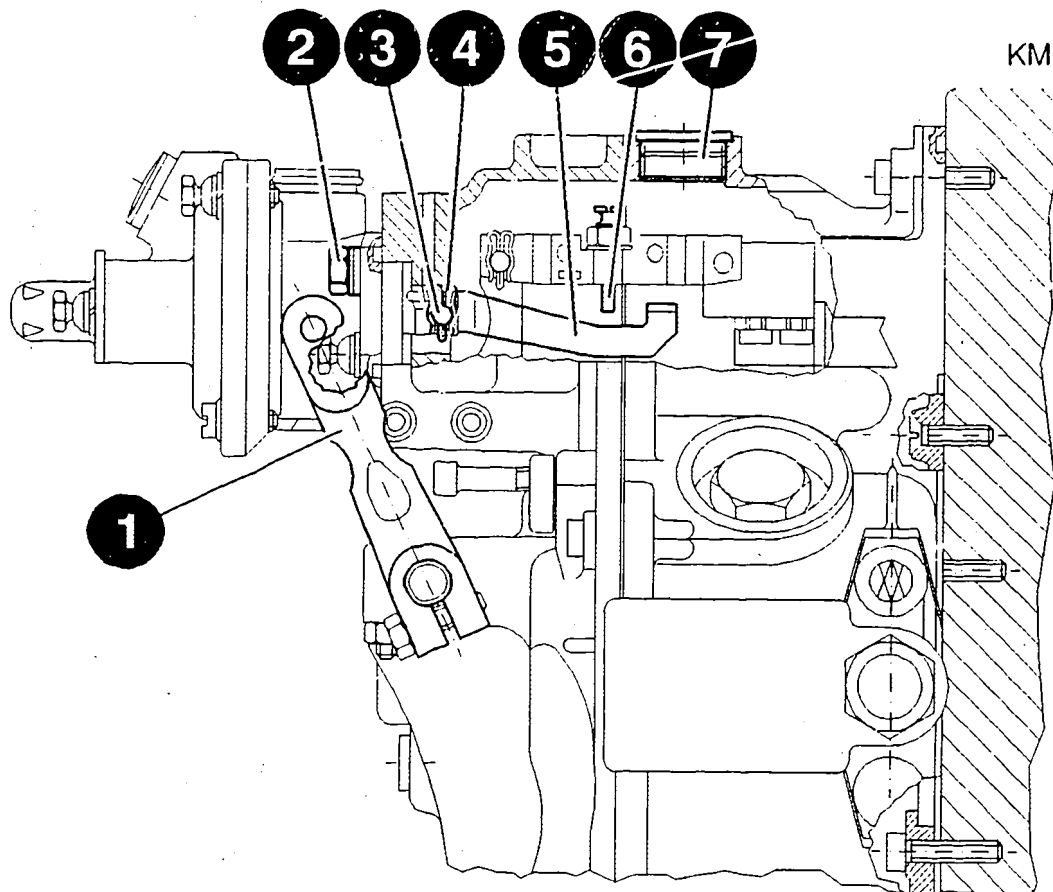
- * Detachment of LDA
 - Screw out bolts (2) (loosen shear bolt with hammer and chisel).
Screw back idle screw at control lever (1) as far as it will go.
 - Pull control lever into "shutoff" position.
 - Pull out LDA roughly 10 mm, then turn counter-clockwise through 90 (as viewed from governor end) and take out carefully.



KMK11881

- * Replacement of plate
 - Pull off locking spring (4).
 - Remove LDA plate (5) from lifting rod.
 - Attach new LDA plate (5).
 - Fit new locking spring (4).

- * Attachment of LDA
 - Move control lever (1) to shutoff position.
 - Turn LDA with LDA plate (5) counter-clockwise through 90 (as viewed from governor end) and insert carefully into top opening in governor cover.
 - Bypass stop pin (6), turn LDA (clockwise) to normal position and guide in last 10 mm.
 - Tighten LDA bolt (2) slightly.



Note:

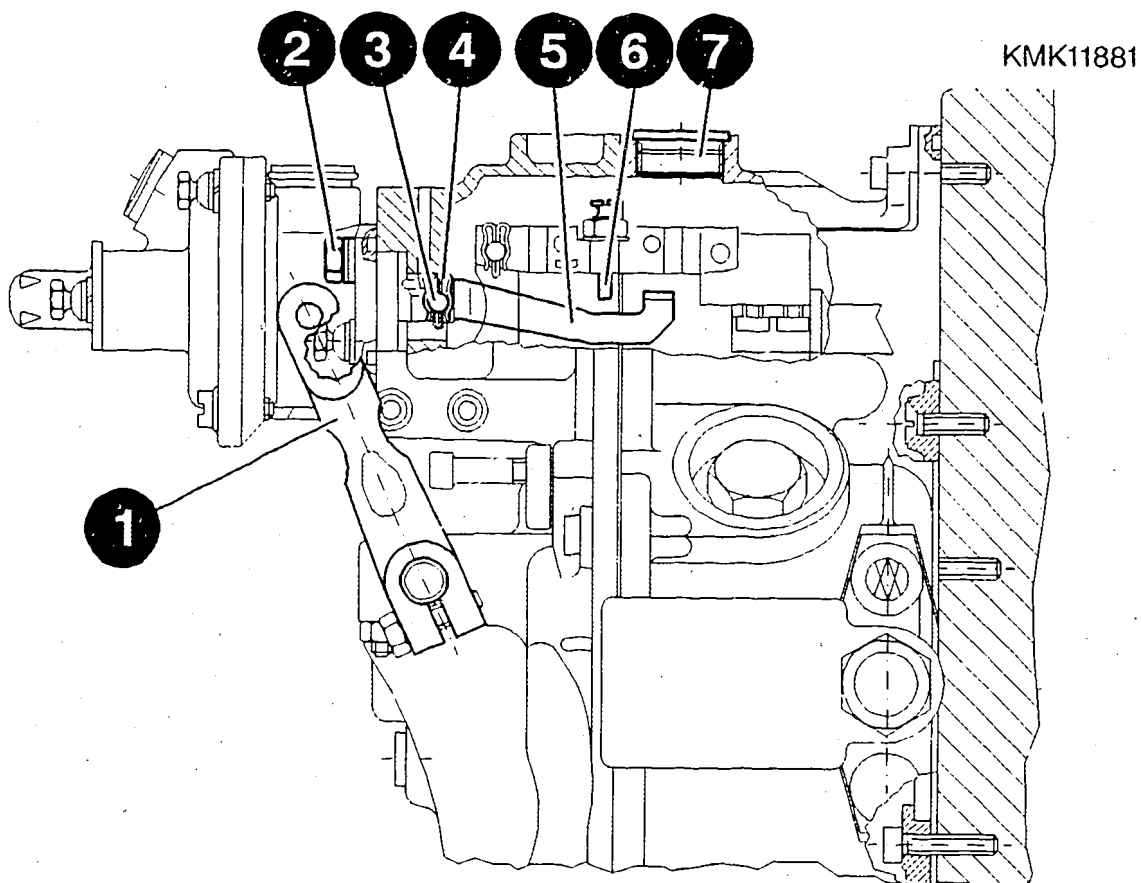
LDA plate (5) is swivel mounted in LDA housing. Incorrect procedure can cause it to become twisted and lead to setting problems/excessive quantity scatter.

Checking:

Correct installation position of LDA plate is to be checked through top adjustment opening (7) in governor housing/cover.

Control-rack travel measurement:

Compare VS and VI control-rack travel to initial values and correct in the event of deviation.



Tighten LDA bolts (2) to 5...7 Nm and shear off shear bolt.

Mark pump with white dot on LDA.

Attachment of assembly to engine:

- Detach control-rack travel measuring instrument.
- Attach pump to engine.
- Set idling speed.

Parts required:

1x LDA plate	1	421	335	042
1x Locking spring	2	424	680	003
1x O-ring	1	420	210	022
1x Shear bolt	2	423	450	002

STIPULATION OF REPAIR TIME

Renewal of plate on removed pump:
max. 10 work units

WARRANTY:

The conversion work by BOSCH Service is subject to the standard warranty conditions. The following entries are to be made on the request for warranty coverage G20/G21:

Fault number : 62

Warranty type : 9

C - part: : Arbeitskarten-Nr.

Plain language: TBA-R0898

Field 80 : X

To be filled in left-justified with no blank spaces.

Bosch Service Stations in Germany should send the LDA plates removed together with request for warranty coverage (G20) to:

Robert Bosch GmbH
FeW/LOG3-Auspackraum
z.W. an K5/QSG2
Wernerstr. 51
70469 Stuttgart

Bosch Service Stations outside Germany should send the LDA plates removed together with request for warranty coverage (G21) to their local Bosch representative.

Department responsible:

ROBERT BOSCH GMBH
Division KH
Service and Warranty (KH/KDG1)

Outside Germany, enquiries should be addressed to the appropriate local representative.

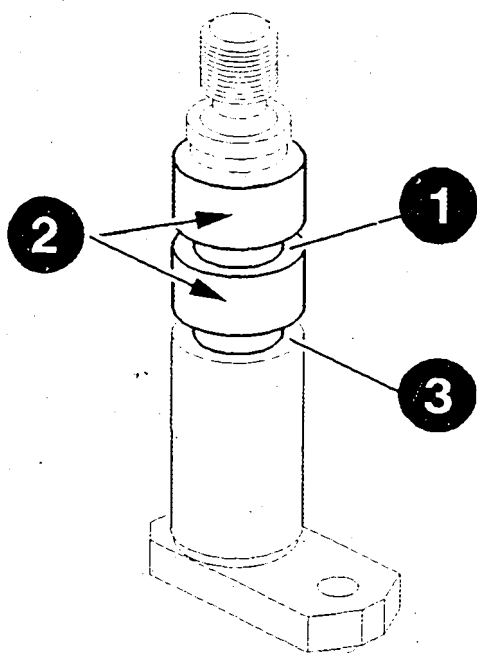
Leakage/stiffness at control lever
shaft (2 O-ring version)

Problems following repairs to control
lever shafts with 2 O-rings make it
imperative to always heed the following
information on control lever shaft
assembly:

The problem arises from a lack of
grease in the O-ring groove and the
area between the O-rings.

- 1 = Upper O-ring groove
- 2 = Area between O-rings
- 3 = Lower O-ring groove

KMK11902



Consequence:

With the 2 O-ring version, the fuel only reaches the lower O-ring.

The upper O-ring is not lubricated, becomes worn and cracks.

Dirt between the shaft and bushing results in stiffness, corrosion and seizure of the control lever shaft.

- 1 = O-ring
- 2 = Control lever shaft

This problem affects MAN, Liebherr and Ford distributor injection pumps

Repair instructions

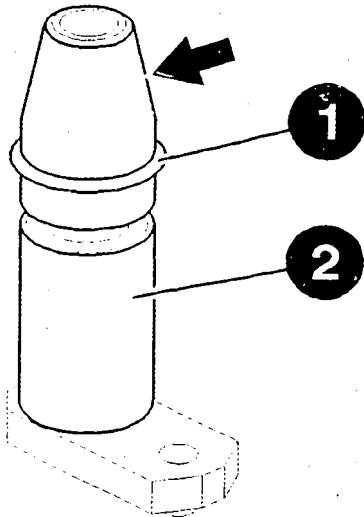
Grease required:

Part no. 5 994 420 005 (Molycote),
45 ml tube.

Seal upper ring groove all round with adhesive tape (no suitable assembly sleeve available).

Fill lower O-ring groove with Molycote.
To protect O-ring, mount assembly sleeve 0 986 611 291 KDEP 2937 (arrow) on control lever shaft.

KMK11903



Slip on lower O-ring until it engages
in groove (in grease).
Remove adhesive tape.
Fill upper O-ring groove with Molycote.
Fit O-ring (O-ring must engage in
grease).
Grease control lever shaft all round
with Molycote between O-rings.
Install control lever shaft in
bushing.

Issued by:

Robert Bosch GmbH
Division KH
Product marketing
Diesel injection systems (KH/PED)

Enquiries outside Germany should be
addressed to the appropriate local
Bosch representative.

Radial piston pump VR
0 470 506 ... for
Cummins ISB engines

Workshop: EP
07.1999
SI 0650 En

Offset Woodruff key in drive taper

Use is made for pump/engine assignment of an offset Woodruff key in the drive taper for Cummins engines with VR pumps. The dial gauge method used to date cannot be applied to these engines.

The Woodruff key is specified at the factory and cannot be reproduced with Service means.

If the genuine Woodruff key is lost, it must be ensured that an identical one is fitted.

The last three digits in the Bosch Woodruff key part no. are therefore to be entered on the injection pump rating plate (arrow).

KMK12005

34903 106350

0470506003

011



BOSCH

394 3760 001

769

Made in Germany

036

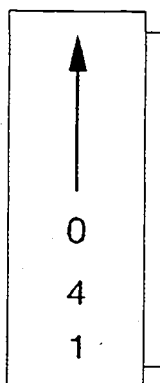


Note:

When fitting Woodruff key, make sure that arrow on top side of key faces injection pump.

The Fig. shows a top view of a Woodruff key. The stamped number represents the last three digits of the Bosch part number.

KMK12023



The Bosch Woodruff key part numbers are assigned in the following table to the respective Cummins and Chrysler numbers.

	Bosch no.	Cummins no.	Chrysler no.
1	460 065 026	3944021	05013260AA
1	460 065 027	3944022	05013234AA
1	460 065 028	3944023	05013208AA
1	460 065 029	3944024	05013182AA
1	460 065 030	3944025	05013156AA
1	460 065 031	3944026	05013130AA
1	460 065 032	3944027	05013104AA
1	460 065 033	3944028	05013078AA
1	460 065 034	3944029	05013052AA
1	460 065 035	3944030	05013026AA
1	460 065 036	3944031	05013000AA

	Bosch no.	Cummins no.	Chrysler no.
1	460 065 037	3944032	05014260AA
1	460 065 038	3944033	05014234AA
1	460 065 039	3944034	05014208AA
1	460 065 040	3944035	05014182AA
1	460 065 041	3944036	05014156AA
1	460 065 042	3944037	05014130AA
1	460 065 043	3944038	05014104AA
1	460 065 044	3944039	05014078AA
1	460 065 045	3944040	05014052AA
1	460 065 046	3944041	05014026AA

Issued by:

Robert Bosch GmbH
Division KH
Product marketing
Diesel injection systems (KH/PED)

Enquiries outside Germany should be
addressed to the appropriate local
Bosch representative.

DISTRIBUTOR INJECTION
PUMPS WITH DIESEL THEFT
DETERRENT (DDS) FOR
FIAT AND IVECO

Workshop: EP
08.1999
ST 0651 En

Engine shutoff and starting problems
on account of DDS 1.1 failure (leakage)

Remedy:

1. Replacement with painted-over
version (identification: blue dot on
DDS, manufactured between 22.03.99
and 28.06.99).

2. Replacement with latest version with
improved weld (identification: green
dot on DDS, manufactured as of
29.06.99)

ATTENTION:

Identical DDS part no.

VEHICLES CONCERNED:

Fiat Ducato 2.8 l with

VE pump	0 460 404 084
	0 460 414 128
	.. 129
	.. 164
	0 460 424 152
	.. 164
	0 460 494 466
and DDS 1.1	0 281 005 013

IVECO Daily / Turbodayly with

VE pump	0 460 404 095
	0 460 424 168
	.. 169
	.. 170
	.. 177
	0 460 494 470
and DDS 1.1	0 281 005 013

IVECO Daily with

VE pump	0 460 494 471
and DDS 1.1	0 281 005 044

Conversion of the DDS 1.1 is covered by the repair instructions W-400/0.. for the diesel theft deterrent.

TIME REQUIRED AND COSTS OF WORK
10 work units are scheduled for DDS 1.1
replacement.

WARRANTY

The following applies to this stipulation:

Warranty period of 1 year plus goodwill
period of 2 years and unlimited
mileage.

Enter the following on the request for
warranty coverage G20/21:

- Fault number (code): MN or 98
- Type of warranty : 0
- C-Section : Job card no.
Plain language : TBA 0497
Field 80 : X

Faulty parts together with request for
warranty coverage (G20/21) and delivery
note KH/VKD3-15333-2 are to be
submitted to the following address:

* Within Germany to:

Robert BOSCH GmbH
FeW/LOG3-Auspackraum
z. W. an K5/QSG1
Wernerstraße 51
70469 Stuttgart

* In all other countries to:

Local BOSCH representative for
forwarding to K5/QSG1.

Department responsible:

ROBERT BOSCH GMBH

Division KH

Service and Warranty (KH/KDG1)

Outside Germany, enquiries should be addressed to the appropriate local representative.

NOZZLE TESTERS

EPS 100 0 684 200 704
EFEP 60 H 0 681 200 502

Workshop: EP

08.1999

SI 0652 En

When purchasing a new nozzle tester, Bosch Service Stations should always give preference to the EPS 100 as opposed to the obsolete EFEP 60 H.

The reasons for this are as follows:

NOZZLE OPENING PRESSURE

When adjusting a nozzle-holder assembly with the EFEP 60 H, a total error of +/- 4 to 6.5 bar with respect to the set value may result.

Users cannot recognize this "error".

A change in nozzle opening pressure of 10 bar alters the quantity by approx. 1 mm³/stroke.

This has a considerable influence on idle and may lead to "idle vibration".

With the EPS 100, the total possible error is +/- 2.4 bar.

CHATTER

The chatter level is governed to a great extent by the "error volume" of the nozzle tester.

This volume is only precisely defined with the EPS 100 and can be set to the prescribed value.

Reliable classification into the respective characteristic chatter groups is not possible with the EFEP 60 H.

LEAKAGE

Freedom from needle leaks is very important with constant-pressure valves.

Even minor leaks have a considerable influence on idle (idle vibration).

The EPS 100 makes use of special elements with an additional gasket set and extremely low leak fuel rate.

Leak testing can therefore only be performed accurately with this unit.

MAINTENANCE

ISO 8984 prescribes regular checking.

The maintenance schedule for the EPS 100 prescribes 6-monthly test intervals.

The calibration set 1 688 130 194 has been developed in line with ISO 8984 for performance of these 6-monthly checks.

This test procedure guarantees quality assurance as per ISO 9000 for the ISO nozzle tester EPS 100.

NOTE

The EFEP 60 H is not approved for checking test nozzle-holder assemblies.

The EPS 100 is mandatory for Bosch Service Stations with their own test bench.

Department responsible:

ROBERT BOSCH GMBH

Division KH

Service and Warranty (KH/KDG1)

Outside Germany, enquiries should be addressed to the appropriate local representative.

CUMMINS
DIESEL ENGINES 6BTAA
EURO 2 WITH DIST. INJ. PUMP

Workshop: EP
09.1999
SI 0653 En

Goodwill provision in the event of
broken plunger return spring
(compression spring)

Pumps affected:

Bosch no. : 0 460 426 245
Engine : 6BTAA
Output : 108 kW (145 hp) / 2500 1/min
Cummins
pump no. : 3282753

Pumps affected:

Bosch no. : 0 460 426 246
Engine : 6BTAA
120 kW (160 hp) / 2500 1/min
Cummins
pump no. : 3282744

Bosch no. : 0 460 426 249
Engine : 6 BTAA
134 kW (180 hp) / 2500 1/min
Cummins
pump no. : 3283026

Pumps affected:

Bosch no. : 0 460 426 254
Engine : 6BTAA
97 kW (130 hp) / 2500 1/min
Cummins
pump no. : 3282755

Date of manufacture (FD):

571 (11.1995) to 862 (02.1998)

In isolated cases, the plunger return springs may break on these pumps.

Replace compression springs as a set only if damaged. This involves making use of the parts set 1 467 010 495 (2 springs of same tolerance class).

The current Bosch work units (AW) apply to distributor injection pump repairs.

Use can be made of an exchange pump if a pump can no longer be repaired on account of irreparable damage.

Restrictions:

1. This provision applies only to broken plunger return springs.
2. A further 6 month period is granted in addition to the standard warranty (2 years/209 000 km as of vehicle licensing).
3. Damaged parts must be submitted to Bosch; otherwise costs cannot be re-imbursed.
4. This bulletin applies until 02.2001.

Warranty:

Enter the following in the request for warranty coverage G20/G21:

- * Fault number (code): HB
- * Type of warranty: 7
- * C-Section: Job card no.
Plain language: Service Info SI 0653
- * Field 80: X

Please send damaged parts together with request for warranty coverage (G29/G21) and delivery note KH/VKD3-15333-2 to the following address:

* In Germany to:

Robert Bosch GmbH
FEW/LOG3-Auspackraum
z.W. an K5/QSG1-HG
Am Boschwerk
D-70469 Stuttgart

* In all other countries:

To local Bosch representative for
forwarding to K5/QSG1-HG.

Department responsible:

ROBERT BOSCH GMBH
Division KH
Service and Warranty (KH/KDG1)

Outside Germany, enquiries should be
addressed to the appropriate local
representative.

GOVERNOR CONVERSION
FOR INJECTION PUMP ASSEMBLY
0 402 946 025
FOR SCANIA ENGINE DSC 9 15
IN SCANIA COMM. VEH.

Workshop: EP
12.1999
ST 0657 En

The above-mentioned Scania engine is a special version for South America, Korea and Taiwan.

In isolated cases this engine may be subject to unsatisfactory load take-up on driving off.

Outside the above-mentioned countries Scania offers a governor conversion package which eliminates this problem and involves converting the existing injection pump assembly to that of the DSC 13.

Outside the above countries, Scania offer a governor conversion package to eliminate this problem. The existing injection-pump assembly is converted to that of the DSC913.

CONVERSION WORK

Replace LDA spring 2 424 619 993 (item 89/2 of spare parts list for governor 0 421 814 178) with LDA spring 2 424 619 994 and adjust injection-pump assembly in line with test specifications for injection-pump assembly 0 402 946 015.

Then change injection pump marking to 0 402 946 015.

The costs of conversion work are to be billed.

Department responsible:

ROBERT BOSCH GMBH

Division KH

Service and Warranty (KH/KDG1)

Outside Germany, enquiries should be addressed to the appropriate local representative.

IN-LINE FUEL-INJECTION
PUMPS MW 0 403 474 021 E
FOR LIEBHERR EXCAVATORS
TYPE 932

Workshop: EP
11.1999
ST 0658 En

Fracture of valve reed in return
flow restriction

Fragments of the reed may ingress into
the nozzle and clog the injection
orifices, thus leading to clouds of
smoke and loss of power.

REMEDY:

1. Replacement of all 4 delivery-
valve holders 1 413 356 066 in
line with new parts list, including
O-ring 1 410 210 04i and copper
sealing ring 1 410 505 024.
2. Replacement of all 4 nozzle-and-
holder assemblies 0 432 191 591.
3. Thorough cleaning (flushing) of
entire fuel-injection tubing.

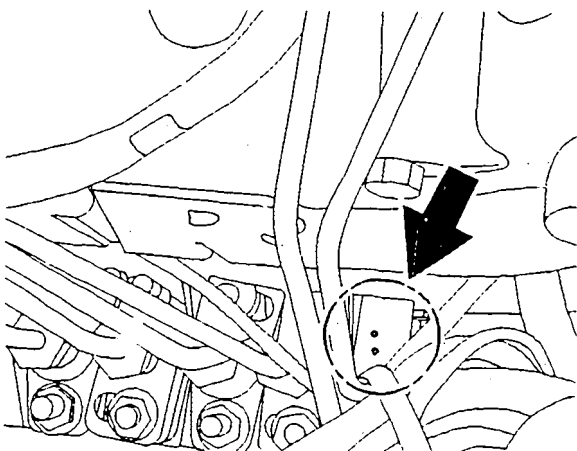
IDENTIFICATION

Two center punch marks (see Fig.) are to be made on the converted pumps.

Injection-pump assemblies already converted can be identified from this mark.

The new return flow restrictions are fitted as standard as of engine number 99 01 1811.

KMK12435



WARRANTY PROCEDURE:

Enter the following on the request
for warranty coverage G 20/21:

Part A:

- * Fault number (code): 20
- * Type designation of pump

- * Type of warranty
 - Within warranty period: 0
 - After warranty period: 7

Part B:

- * Parts replaced, including nozzle-
and-holder assemblies.

WARRANTY PROCEDURE (continued)

Enter the following on the request
for warranty coverage G 20/21:

Part C:

- * Job card number
- * Plain language: TBA R0999
- * In field 80: X

Customer warranty claims are to be
provisionally recognized by Bosch
Service Stations. Robert Bosch GmbH
reserve the right to take the
ultimate decision on warranty
acceptance.

Bosch Service Stations in Germany should send the parts replaced together with the request for warranty coverage G20 to:

Robert Bosch GmbH
Fe W/LOG3 - Auspackraum
z.W. an K5/QSG1
Wernerstr. 51
70469 Stuttgart

Bosch Service Stations outside Germany should send the parts replaced together with the request for warranty coverage G21 to their local Bosch representative.

Department responsible:

ROBERT BOSCH GMBH
Division KH
Service and Warranty (KH/KDG1)

Outside Germany, enquiries should be addressed to the appropriate local representative.

Complaints about constant-pressure
valves

The cone of the constant-pressure valve may occasionally rupture on in-line pumps of sizes P, H and R.

This can lead to rough engine running, loss of power and smoke formation.

All constant-pressure valves may be subject to the above problems. The item number of the constant-pressure valve in the service parts list for all the above-mentioned pumps is 13.

To help identify the constant-pressure valves, the part number range is indicated below:

For size P:

Constant-pressure valve 2 418 559 ...

For size H:

Constant-pressure valve 2 418 529 ...

For sizes R and P:

Constant-pressure valve 2 418 549 ...

The constant-pressure valves have since been improved. Only valves of the latest production status are to be fitted. These can be identified by way of the blue labelling between two lines on the valve cone.

The new constant-pressure valve was introduced in series as of 08.1999. Only constant-pressure valves with the latest production status are now being supplied.

Old constant-pressure valves can be returned in line with the usual warranty procedures.

Bosch Service Stations in Germany should submit the completed request for warranty coverage G20 (domestic) together with the constant-pressure valves to:

Robert Bosch GmbH
FeW/LOG3 - Auspackraum
z.W. an K5/QSG1
Wernerstr. 51
D-70469 Stuttgart

Reference should be made to this Service Telegram in the C-section of the warranty documentation.

Bosch Service Stations outside Germany should submit the constant-pressure valves together with the completed request for warranty coverage G21 to their local Bosch representative for remuneration purposes.

In the event of a complaint, all constant-pressure valves on the in-line pump are to be replaced. As minute particles of the ruptured constant-pressure valve could ingress into the injection tubing/nozzle-holder assembly (DHK) and cause subsequent damage, it is appropriate to also renew the DHK at the port at which the ruptured constant-pressure valve was replaced as a precautionary measure.

The injection tubing of the port concerned is to be carefully cleaned (blow out with compressed air, visually inspect sealing cone).

Customers are to be informed in writing about the rupture of the constant-pressure valve as well as the need for cleaning the injection tubing and replacing the DHK.

Use can be made for this purpose of the test record for Bosch in-line pumps in which a note is to be made concerning rupture of the constant-pressure valve and the need for cleaning of the tubing/DHK replacement.

The work is to be performed free of charge during the warranty period.

The warranty claim is always to be filed under fault number 22.

The chassis number of the vehicle in question is also to be indicated in plain language.

Department responsible:

ROBERT BOSCH GMBH

Division KH

Service and Warranty (KH/KDG1)

Outside Germany, enquiries should be addressed to the appropriate local representative.

NOZZLE-AND-HOLDER
ASSEMBLIES
0 432 ..

Workshop: EP
12.1999
SI 0661 En

Warranty procedure for nozzle-and-
holder assemblies from Mack Reman
Center, USA

At their Reman Center in Middletown,
Pennsylvania, USA, Mack Trucks USA
condition the following Bosch nozzle-
and-holder assemblies (DHK) and
distribute them worldwide:

BOSCH part no.	:	0 432 193 671
BOSCH exchange	:	0 986 430 513
Mack part no.	:	736 GB 49 M3
BOSCH part no.	:	0 432 193 672
BOSCH exchange	:	-----
Mack part no.	:	736 GC 49 M4
BOSCH part no.	:	0 432 193 673
BOSCH exchange	:	-----
Mack part no.	:	736 GB 49 M2
BOSCH part no.	:	0 432 193 674
BOSCH exchange	:	0 986 430 509
Mack part no.	:	736 GB 49 M

The nozzle-and-holder assemblies conditioned by Mack-Middletown are marked "mrc" on the end face.

Warranty for Mack Reman Center nozzle-and-holder assemblies is handled exclusively via the Mack Service organization.

The listed nozzle-and-holder assemblies are fitted on series E7 E-Tech engines equipped with the Bosch Electronic Unit Pump System (UPS).

Mack vehicles with these engines are chiefly to be found in the USA and Canada.

Robert Bosch is not at present in a position to perform field repairs on UPS nozzle-and-holder assemblies.

Should replacements be required, the Bosch exchange nozzle-and holder assembly 0 986 430 509 is available for the nozzle-and-holder assembly 0 432 193 674.

Department responsible:

ROBERT BOSCH GMBH

Division KH

Service and Warranty (KH/KDG1)

Outside Germany, enquiries should be addressed to the appropriate local representative.